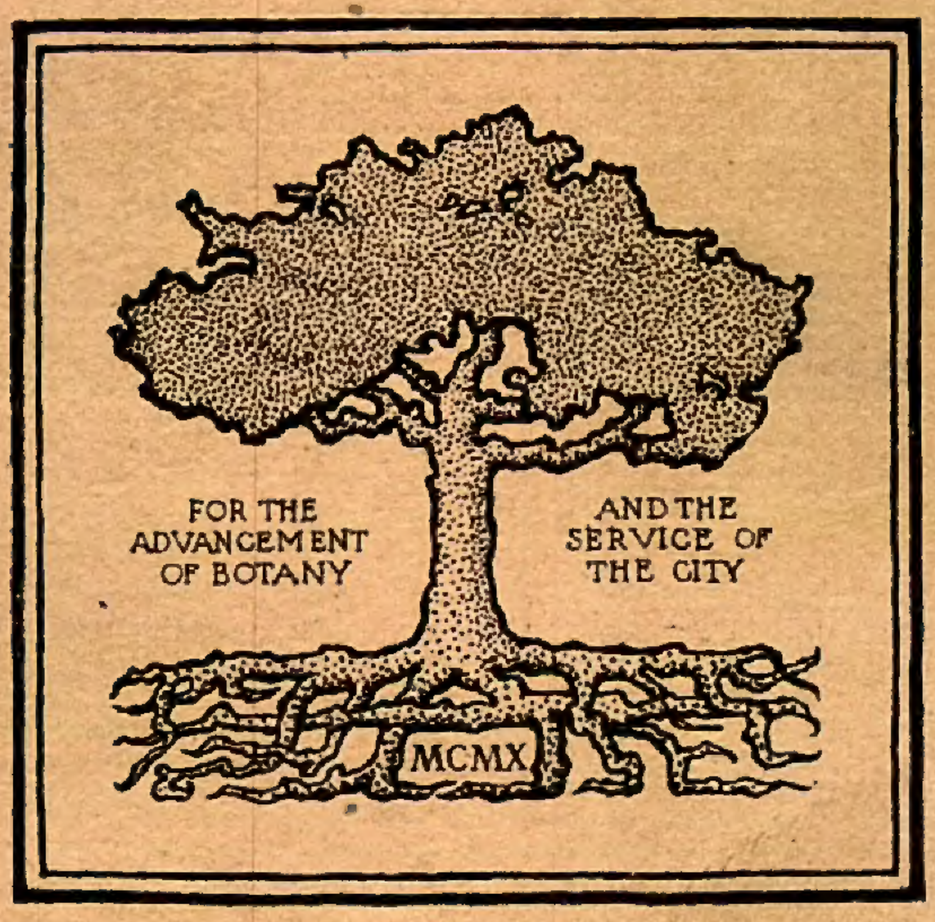
BROOKLYN BOTANIC GARDEN

RECORD

VOL. I JANUARY, 1912 No. 1

EDITED BY

C. STUART GAGER



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PUBLISHED FOR THE GARDEN
BROOKLYN, N. Y.

Botanic Garden Staff

DR. C. STUART GAGER, *Director*,

MR. NORMAN TAYLOR, *Curator of Plants*,

MISS BERTHA M. EVES, *Secretary and Librarian*,

MR. JOHN V. BORIN, *Head Gardener*,

MR. HERMANN KOLSH, *Foreman Gardener*.

FIG. 1. Laboratory and Instruction Building

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. I Brooklyn, N. Y., January, 1912 No. 1

FOREWORD

THE BROOKLYN BOTANIC GARDEN RECORD, inaugurated with this number, will, until further notice, be issued quarterly. It is purely an administrative organ, and is not intended either as a scientific publication or as a newspaper, but, as its name indicates, to serve as a record of the development and progress of the Garden, and as a medium of communication between the Garden and its constituency. One of the numbers of each volume will contain the Annual Report of the Director of the Garden.

REPORT OF A TRIP TO WESTERN CUBA IN THE FALL OF 1910

To the Committee on Botanic Garden,

The Brooklyn Institute of Arts and Sciences.

GENTLEMEN:

Having been granted by you leave of absence for a trip of botanical exploration in Cuba, I sailed from New York on the Ward Line Steamer, Havana, on August 20th. The other members of the party, sent out by the New York Botanical Garden, at Bronx Park, consisted of Dr. N. L. Britton, Director-in-Chief of that Garden, and Mrs. Britton. We reached Havana on the

morning of August 24, and were joined there by Professor F. S. Earle, formerly Director of the Agricultural Experiment Station, established in Cuba by the United States Government.

The afternoon of the twenty-fourth we spent along the north shore, in the vicinity of Cojimar, securing there a number of herbarium specimens and several photographs of the vegetation, including a negative of the cactus, *Cephalocereus Bakeri*, hitherto unphotographed.

On the twenty-fifth we took the train for Herradura, in the province of Pinar del Rio, and for the remainder of the time confined our operations to that province. At Herradura we were for ten days the guests of Professor and Mrs. F. S. Earle in their typical, thatched roof, Cuban country home, making this our base, and taking daily trips into the savannas and palm barrens for a radius of several miles. Herradura lies in the midst

FIG. 2. Sierra San Vicente. North face. *Bombax emarginatum* and agaves occupy the perpendicular rock wall.

of the area of the barrigona palm (*Colpothrinax Wrightii*), conspicuous for the marked enlargement of the trunk near the middle. It was this feature that gave the palm its name, *barrigon,* being the Spanish word for big belly. The palm is also known locally, to "Americanos," as the "barrel palm," possibly because of its shape, but more probably because the swollen portion of the trunk is much in use by the Cubano guajiros as a water barrel. In rare instances this trunk is utilized for porch pillars in the building of dwellings.

This being the rainy season, we found many species in flower that would not be blooming at other months, and we easily made fifty to seventy-five collection numbers a day, including living plants for the conservatories, dried specimens for the herbarium, and material for museum and laboratory purposes preserved in formalin.

On the 31st of August we drove to San Diego de los Baños, the seat of one of the oldest and most famous watering places on the island, and from here as a base, made journeys on foot and horseback into the surrounding valleys and mountains.

We returned to Herradura on September 3, and on September 5 proceeded thence westward, by train, to the City of Pinar del Rio, in the center of the Vuelta Abajo, the most famous tobacco region of the world. With this city as a base, we spent several days on the savannas, pine barrens, and *lagunas* lying between the city and the south shore of the island. One day we spent along the coast of the Caribbean Sea, at Coloma, the port of Pinar del Rio. These savannas and lagunas were rich in variety of specimens, including the sundews (*Drosera*), the yellow-flowered bladderworts (*Utricularia*), the water-hyacinth (*Piaropus crassipes*), numerous grasses and sedges, shrubs, and young scattered saplings of the West Indian pine. Most of the larger trees in the province have been cut down and the wood used for making charcoal.

On the twelfth of September we transferred our base to Baños San Vicente, in the Sierra del Rosario, approximately midway between Pinar del Rio and the north coast. Between Pinar del Rio and San Vicente lies the village of Viñales, nestling in a vale of surpassing beauty. The range of mountains, of

which the Sierra del Rosario are a part, forms a backbone through the province from northeast to southwest, and somewhat north of the central axis. The rock is recent limestone, containing innumerable caves, and weathered to a surface which the natives fittingly call *diente de perro*. It is only when one tries to climb

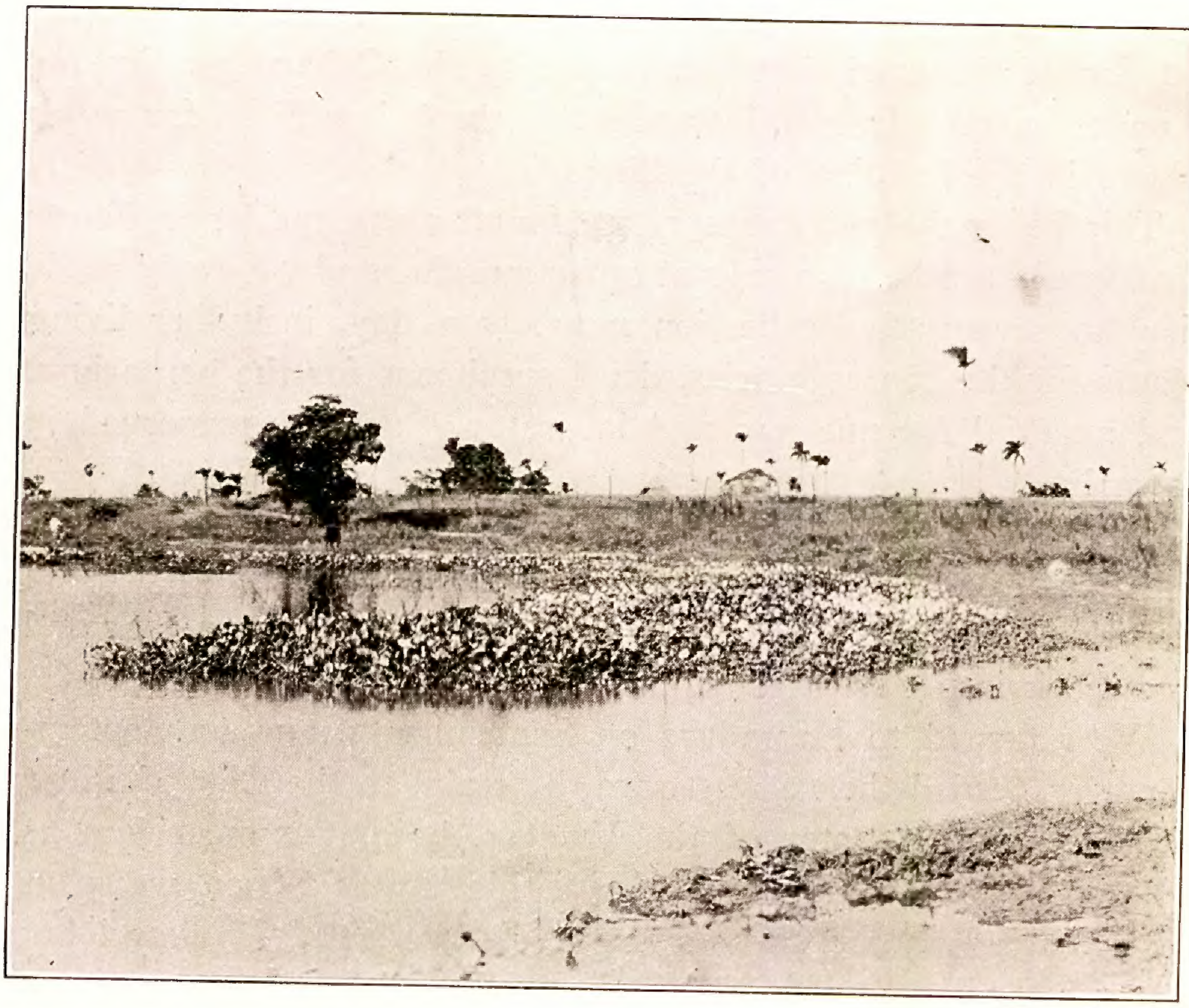

FIG. 3. Laguna near Pinar del Rio, Cuba, showing the water-hyacinth (*Piaropus crassipes*), which here grows as a weed.

the slopes that he realizes how truly descriptive is the name, Sierra. To negotiate these mountains on horseback was absolutely impossible, for not only were their approximately horizontal surfaces honeycombed and serrate, but in most instances the slopes were perpendicular to a height of 700-800 feet, usually with a young, rocky talus on one side only. Isolated crags occurred here and there, with tempting plants quite inaccessible. However, with the assistance of a *practico* with his *machete*, we made our way to the summits of some of the higher peaks, securing many photographs and a large number of specimens. Here

we found a *Zamia* (*Z. Ottonis?*), the mountain palm (*Gaussia*) in fruit, and numerous orchids, hohenbergias, tillandsias, and other epiphytes. The most conspicuous plant of this mountain vegetation was the rather large tree (*Bombax emarginatum*), known locally as the *ceibon,* with a bright green, tapering trunk. All specimens of this tree growing in accessible places had been destroyed in the interests of the charcoal industry, but we managed to secure specimens of the bark, leaves, and fruit. The bark has a remarkable development of bast, and is used for cords to tie up bales of tobacco for shipment.

FIG. 4. *Catesbaea spinosa* in fruit. North shore of Pinar del Rio, Cuba, west of Esperanza.

From San Vicente we drove over the American-built *calzada,* or stone road, to Esperanza on the north coast. Here there was little that was new, though some beautiful specimens of the shrub, *Catesbaea spinosa,* loaded with ripe fruit, were found and photographed, and herbarium and museum material collected.

On September 17 we returned to Pinar del Rio, and on the

following afternoon, to Havana. The remainder of that week, from the 19th to the 23d, was spent at Mariel, on the northeast coast of the province of Pinar del Rio. Mariel is reached from Havana by trolley to Guanajay, and thence by coach about seven miles to the coast. The new plants secured along the coast

FIG. 5. An agave in fruit. North shore of Pinar del Rio, Cuba, east of the entrance to the harbor of Mariel.

of the harbor and Gulf of Mexico, near Mariel, were interesting and numerous, including the cactus, *Harrisia eriophora,* the beach palm (*Thrinax parviflora*) in fruit, a species of the

rare blue flowered "skull cap," *Scutellaria havanensis,* probably not hitherto seen by botanists for about eighty years, and a century plant (*Agave*). In the exploration of this coast we used a small schooner.

We returned to Havana again on the afternoon of the twenty-third, and set sail on the steamer Havana the following afternoon, reaching New York on September twenty-seventh.

The expedition may be regarded as successful from every point of view. Though we were in the tropics during the warm, rainy season, our operations were interfered with by rain on only two or three days, and then for only a portion of the day. Approximately three thousand and five hundred specimens were secured, living and preserved, comprising over 1400 collection numbers, and over 120 photographs of vegetation and characteristic Cuban scenes.

The Brooklyn Botanic Garden, and the Director personally, are deeply indebted to Dr. Britton, and the New York Botanical Garden for the opportunities and advantages of this trip, which were enjoyed without any expense to the Brooklyn Botanic Garden, and will prove of inestimable value to our institution.

Through the further kindness of the Director of the New York Botanical Garden, living specimens, collected in duplicate for the Brooklyn Garden, will be cared for at the Bronx until our own plant houses are completed.

Respectfully submitted,
(Signed) C. STUART GAGER,
Director of the Garden.

Brooklyn, N. Y.,
29 September, 1910.

AGREEMENT BETWEEN THE CITY OF NEW YORK AND THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES CONCERNING THE BROOKLYN BOTANIC GARDEN

THIS AGREEMENT made and concluded on the 28th day of December, in the year nineteen hundred and nine, between THE CITY OF NEW YORK, acting by its Board of Estimate and Appor-

tionment, party of the first part, and the Brooklyn Institute of Arts and Sciences, party of the second part, WITNESSETH:

Authorizing Legislation

WHEREAS, by an act of Legislature of the State of New York, known as Chapter 618 of the Laws of 1906, entitled "An Act to amend Chapter 509 of the Laws of 1897," entitled "An Act to provide for the establishment of a botanic garden and arboretum on park lands in the City of Brooklyn, and for the care of the same," the party of the first part, acting by its Board of Estimate and Apportionment, is expressly authorized to enter into a contract, on the recommendation of the Board of Commissioners of Public Parks of said City of New York, with the said Brooklyn Institute of Arts and Sciences, party of the second part, for the establishing and maintaining by said Institute of a botanic garden and arboretum on any or all of certain lands described and set forth in said act, and

Private Endowment

WHEREAS, the party of the second part has raised or secured by private subscription, the sum of Fifty thousand dollars within one year from the passage of said act, the principal of which sum, or the income thereof, is to be set apart and used exclusively by said Institute, party of the second part, for the purchase of plants, flowers, shrubs and trees to be set out in said botanic garden and arboretum; and

WHEREAS, the party of the first part desires that the party of the second part shall have charge of the establishment, development and administration of said botanic garden and arboretum for the benefit of the residents of said city; and said party of the second part is willing to take charge of the establishment, development and administration of said botanic garden and arboretum upon the terms and conditions herein set forth;

NOW, THERFORE, in consideration of the actions already taken under said Chapter 618 of the Laws of 1906, and in consideration of the mutual agreements herein contained, it is agreed by and between the said parties as follows; viz.:

Lease and Boundaries of the Garden

FIRST.—That the party of the first part has granted and demised and doth by these presents grant, demise, and let unto the said party of the second part the park lands lying between Eastern Parkway on the north; Washington Avenue on the east; the line of division between the old town of Flatbush and the old City of Brooklyn on the south; and Flatbush Avenue on the west (excepting therefrom lands reserved for the Prospect Heights Reservoir; lands leased to the Brooklyn Institute of Arts and Sciences for museum purposes; lands designated as a site for a public library, under Chapter 503 of the Laws of 1905, and land designated and set apart by the party of the first part as a site for an astronomical observatory, under Chapter 637 of the Laws of 1906), bounded and described

as follows: Beginning on the easterly side of Flatbush Avenue where the northerly side of President Street, if prolonged, would intersect the easterly side of Flatbush Avenue; running thence easterly along the northerly side of old President Street 300 feet 3½ inches; thence in a southerly direction at right angles to said old President Street 130 feet 1½ inches; thence in an easterly direction parallel to the northerly side of old President Street 180 feet; thence in a northerly direction at right angles to old President Street 130 feet 1½ inches to the northerly line of said President Street; thence along the northerly side of old President Street in an easterly direction 244 feet 2½ inches to the westerly side of old Grand Avenue; thence southerly along the westerly side of old Grand Avenue 170 feet; thence easterly on a line parallel with the northerly side of old President Street 834 feet 7½ inches to the westerly side of Washington Avenue; thence southerly along the westerly side of Washington Avenue 1,110 feet 7½ inches; thence in a southwesterly direction along the line formerly separating the old town of Flatbush from the old City of Brooklyn 746 feet 4 inches to the easterly side of Flatbush Avenue; thence along the easterly side of Flatbush Avenue 2,643 feet 5 inches to the point or place of beginning. All dimensions being more or less; and any building or buildings erected, or that may be erected on the said lands heretofore described, and any equipment of said building or buildings now provided or that may be provided by the party of the first part, to have and to hold the same so long as the said party of the second part shall continue to carry out the objects and purposes defined in its present charter, or any amendment of said charter, and shall maintain and administer on said lands a botanic garden and arboretum as provided in Chapter 618 of the Laws of 1906; and shall faithfully keep, perform and observe the covenants and conditions herein contained on its part, to be kept, performed and observed until said land and the building or buildings erected thereon shall be surrendered by the said party of the second part as hereinafter provided. A map or diagram of the land covered by this agreement is appended herewith.

Limitations of Use of Property

SECOND.—That as soon as practicable after the execution of this agreement, and upon a date to be mutually agreed upon by the parties hereto, the party of the first part agrees to transfer, in accordance with the authority granted by said Chapter 618 of the Laws of 1906, and the party of the second part agrees to take over said land and any building or buildings thereon, and the equipment of the same, and from and after said date the party of the second part shall have the exclusive use of the whole of said land, and of any building or buildings and equipments located thereon subject to the provisions herein contained, and without any other limitation whatever during the continuance of the term hereby granted, or until the surrender thereof as herein provided.

Plans and Development

THIRD.—That plans for said botanic garden and arboretum shall be prepared as soon as possible after the execution of this agreement, and upon their approval by the Board of Park Commissioners of said City of New York, the party of the second part shall proceed to establish, develop and maintain on the said land a botanic garden and arboretum in accordance with said plans.

Use of Buildings

FOURTH.—That upon the completion of any plant house or plant houses, or rooms for instruction in botany on said land by the party of the first part, acting through its Board of Park Commissioners, the Brooklyn Institute of Arts and Sciences shall enter into possession of said plant house or houses, and rooms for instruction, and shall use the same in connection with, or as a part of said botanic garden and arboretum for the care and culture of tender or other plants, indigenous or exotic, and for the giving of instruction in botany to the residents of the City of New York, in accordance with the provisions of Section 2 of said Chapter 618 of the Laws of 1906.

Loss by Fire, and Repairs

FIFTH.—That neither the party of the first part, its successor or successors, shall be in any manner chargeable or liable for the preservation of said plant house or plant houses, or rooms for instruction, or other structures, or for the machinery or equipment, or contents thereof, or for the property of the party of the second part which may be placed in said botanic garden and arboretum covered or included within this agreement, or in any buildings, erected thereon against fire nor for any damage or for injury which may be caused by fire to said property; but it is agreed that the damages aforesaid excepted, the said party of the first part shall make, at its own cost and expense such changes, repairs, alterations and renewals in the buildings, machinery, and stationary equipment of the same, as may from time to time be agreed upon between the party of the first part, acting by its Commissioner of Parks for the Boroughs of Brooklyn and Queens, and the party of the second part; and all such changes, repairs, alterations or renewals shall be made upon plans and specifications provided by the party of the first part and approved by the party of the second part.

Annual Maintenance

SIXTH.—That the said party of the first part hereby agrees FROM AND AFTER JANUARY 1, 1910, to provide or appropriate annually for the use of the party of the second part, such sum or sums of money AS MAY SEEM TO THE SAID PARTY OF THE FIRST PART TO BE NECESSARY FOR PROPER MAINTENANCE; and it is expressly understood and agreed by and between the parties hereto that such sum or sums so appropriated shall be expended by the party of the second part for the care and maintenance of said botanic garden and arboretum, its grounds, buildings, apparatus, library and col-

lections; for heating its buildings and for lighting its buildings and grounds; for the payment of salaries of a Botanist and his assistants, and necessary officers of administration; for the payment of wages of all employees required to properly care for and maintain the said botanic garden and arboretum, its equipment and collections; for furnishing books, charts and other publications relating to botany and required for use in connection with the said botanic garden and arboretum; for the cost of cases, racks, frames, supports and other means of preserving and exhibiting publications, photographs and apparatus; for the purchase of photographic apparatus and materials, supplies, labels, pottery and utensils required in the proper administration of the botanic garden and arboretum and for the purchase of soil, fertilizers and other materials required for the proper culture, care and protection of plants grown in said botanic garden and arboretum, and for the publication of reports on the scientific and educational work carried on in connection therewith, and the cost of making or printing annual or other reports desired or required by the party of the first part.

Status of Property variously Owned

SEVENTH.—That all property purchased by funds belonging to the party of the second part, or otherwise acquired by the party of the second part and placed by it in said botanic garden and arboretum shall continue to remain absolutely the property of the party of the second part and may be sold, loaned, exchanged or removed by it at any time, excepting only plants, trees, or shrubs set in the soil of said botanic garden and arboretum, subject, however, to the provisions in this agreement contained; and that the party of the second part may at any time sell or exchange photographs, publications, implements and appliances acquired or purchased with money supplied by the party of the first part, provided, however, that the net proceeds of such sales or exchanges shall be devoted by the party of the second part solely to the benefit or increase of the apparatus, library, or equipment or maintenance of said botanic garden and arboretum.

Public Exhibits: Material for Public Schools

EIGHTH.—That the party of the second part is hereby expressly authorized to exhibit photographs, charts, apparatus or publications relating to botany, in this city or elsewhere, in the public schools or otherwise, for educational or scientific purposes, provided, however, that all the net proceeds, if any, of such exhibitions shall be devoted solely to the benefit or increase of the library, the apparatus and equipment of the botanic garden and arboretum, and said party of the second part shall, so far as any surplus resources will permit, furnish plants or botanic material for use in the teaching of botany in the public schools of The City of New York, and in case the supply of plants or materials for instruction is not exhausted by the demand of the public schools of the City, such plants and botanic materials may, at the discretion of the party of the second part be furnished to other educational institutions within said City.

Free Admission to Grounds and Buildings

NINTH.—It is mutually understood and agreed that said botanic garden and arboretum shall be open and accessible to the public without any charge or gratuity on a portion at least, of every day of the year, under such rules and regulations as the party of the second part may from time to time prescribe; but it is expressly understood and agreed that the party of the second part shall have the privilege of closing the plant houses or rooms for instruction to the public until 2 o'clock in the afternoon on two days in the week for the purpose of scientific research and for the cleaning or re-arranging of collections or apparatus in said plant houses and rooms of instruction. Admission to said houses and rooms of instruction during such closed hours shall be regulated by the party of the second part, but all professors and teachers in the public and private schools or other institutions of learning in New York City, and pupils accompanied by said teachers, shall be admitted on such closed days, subject to the rules and regulations of the party of the second part; but in no case shall there be any charge for the use of the plant houses or rooms for instruction, or for the use of the library, collections, plants or apparatus contained therein.

Annual Report

TENTH.—The party of the second part shall yearly, during the continuance of this agreement, include in its annual report on said botanic garden and arboretum a detailed statement of the operations and transactions of the said party of the second part in relation to said garden and arboretum, and all its receipts and expenses in relation thereto for the fiscal year next preceding, and shall transmit such report to the party of the first part, its successor or successors.

Access to Property and Records

ELEVENTH.—The party of the first part shall have at all times access to every part of said garden and arboretum and to all buildings erected thereon for the purpose of police visitation and supervision, and for the performance of duties devolved upon it by law; and all books, vouchers and accounts relating to the garden and arboretum, or to anything contained therein, shall at all times be open to the inspection of the party of the first part.

Water Supply: Police Protection: Roadways, Walks, Stone Steps

TWELFTH.—The party of the first part hereby agrees to furnish at all times an adequate supply of aqueduct water and adequate police protection; and to construct and keep in repair roadways, walks and stone steps that may be required or be used in said garden and arboretum, or as an approach thereto.

Co-operation with Local Schools: Public Lectures

THIRTEENTH.—The party of the second part hereby agrees to afford such facilities as its resources may be found to permit and as may be

compatible with the proper administration of the garden and arboretum and the interests of the public, to teachers and students in the public or private schools of the city, and to other residents of the city, for the study of botany, and for that purpose to permit teachers in the schools of the city who may be duly authorized by the party of the second part to bring their students to the botanic garden and arboretum where, under the supervision of the proper officers of the garden, instruction may be given to such students in the rooms provided therefor, or in the plant houses or grounds of the garden, at such times and under such regulations as may be determined by the party of the second part; and further to supplement such instruction through lectures by the officers of the botanic garden, or by instructors especially employed for such purpose.

Appointments, Salaries, General Management

FOURTEENTH.—It is expressly understood and agreed that the party of the second part shall have absolute power to appoint, direct, control and remove all persons employed in or about said garden and arboretum and to fix and adjust the salaries of all such persons, and shall be responsible for the same; and the party of the second part shall have power to make all rules and regulations respecting duties for all its employees in and about said garden and arboretum, and the general management and administration of the same, together with its collections, without any restrictions or limitations whatsoever, except as in this agreement contained.

Expeditions: Travelling Expenses

FIFTEENTH.—It is expressly understood and agreed that the Chief Botanist of the garden and arboretum and his assistants shall be given the opportunity to visit other botanic gardens and arboretums within a reasonable distance, and to make expeditions for the purpose of collecting plants for the garden and arboretum and the herbarium of the same; the necessary travelling expenses of said Chief Botanist and of his assistants to be paid from the annual maintenance fund provided by the party of the first part; and the salaries of said Chief Botanist and his assistants shall be continued during such visits or expeditions; but that no moneys provided by the party of the first part shall be expended in connection with such visits or expeditions that have not been expressly appropriated by the party of the first part for such specific purposes.

Investigation: Advancement of Botanical Science

SIXTEENTH.—It is expressly understood and agreed that the Chief Botanist and one or more assistants shall make botanic researches from time to time, and that they shall labor to the best of their ability for the advancement of botanical science, but that the use of said garden for scientific research shall not interfere with its use by the public and private schools and of the public generally for the purpose of general education

or enlightenment, except that a limited space in the building containing the rooms for instruction may be designated by the party of the second part to be used exclusively for research purposes.

Jurisdiction of Commissioner of Parks

SEVENTEENTH.—It is expressly understood and agreed that the botanic garden and arboretum, established and maintained on park lands in the Borough of Brooklyn, shall be under the general jurisdiction of the Park Commissioner of the Boroughs of Brooklyn and Queens, and that application made by the party of the second part for annual maintenance or for changes, repairs, alterations or renewals to structures in said garden and arboretum, or their equipments, shall be made by the party of the second part to the Park Commissioner of the Boroughs of Brooklyn and Queens.

Electric Light and Power

EIGHTEENTH.—It is expressly understood and agreed that the necessary electric current required for the lighting of the botanic garden and arboretum, the plant houses and the building containing the instruction rooms located therein, and the necessary electric power required for the ventilation of the plant houses and rooms of instruction, may be provided, wholly or in part, from the power plant of the Museum of the Brooklyn Institute of Arts and Sciences, situated on adjacent park lands leased to the said Institute, party of the second part; that metal pipes or conduits may be laid between the power plant of said museum to the grounds, the plant houses and the building containing instruction rooms, such pipes to contain wires to convey electric current for lighting and ventilating as hereinbefore described; and that the cost of furnishing electric current or electric power from the power plant of said museum shall be a part of the annual maintenance fund of the botanic garden and arboretum, paid by the party of the first part to the party of the second part.

Brooklyn Institute Herbarium and Collections

NINETEENTH.—That the party of the second part herewith agrees that the herbarium of the Institute and other botanical collections contained in the museum of the Institute, Eastern Parkway and Washington Avenue, shall be used by the Institute in carrying out its plan and purposes in establishing, developing and maintaining a botanic garden and arboretum for the benefit of the residents of the City of New York.

Quittal and Surrender of Premises

TWENTIETH.—That the said party of the second part may at any time after the expiration of three and before the expiration of six months of the date of the service of a notice in writing to the said party of the first part, its successor or successors, or to the Mayor of the City of New York, of its intention so to do, quit and surrender the said premises and remove all its property therefrom, except as hereinbefore provided; and upon and after such notice said party of the second part shall and will,

at the expiration of said six months, quietly and peaceably yield up and surrender to the party of the first part, its successor or successors, all and singular the aforesaid demised premises, and it is expressly understood and agreed by and between the parties hereto that if the party of the second part shall omit to do, perform, fulfill and keep any of the covenants, articles, clauses and agreements, matters and things herein contained, which on its part are to be done, performed, fulfilled and kept according to the true intent and meaning of these presents, then and from thenceforth this grant and demise shall be utterly null and void.

Conditions of Cancellation of Agreement

TWENTY-FIRST.—It is hereby expressly agreed that this contract may be cancelled and annulled at any time by the party of the first part, providing the Board of Estimate and Apportionment of the party of the first part, its successor or successors, after notice in writing to the party of the second part served by mailing or otherwise notifying the party of the second part that some action is to be taken in reference to this agreement, by a vote of three-fourths of all its members by motion or resolution decides that it is for the best interests of the party of the first part that said contract be cancelled or annulled. And it is further agreed that upon said Board of Estimate and Apportionment aforesaid directing the cancellation or annulment of said contract, the party of the first part shall serve upon the party of the second part, or its successor or successors, or any officer thereof, a notice in writing notifying the said party of the second part of the action of the said Board of Estimate and Apportionment, and the said party of the second part shall thereafter, and before the expiration of six months after the date of the service of said notice in writing as aforesaid, notifying the party of the second part of the cancellation or annulment of the contract by the party of the first part, quit and surrender the said premises and remove all of its property therefrom, except as hereinbefore provided, and after such notice, said party of the second part shall and will at or before the expiration of six months, quietly and absolutely yield up and surrender to the party of the first part, its successor or successors, all and singular the aforesaid demised premises, and upon the failure of the party of the second part to remove from said premises all its property and surrender and quit said premises as aforesaid, within six months after the service of notice as aforesaid, the said party of the first part shall have the right to enter in and upon said premises and take possession of same, together with all property of every kind, nature and description remaining thereon.

Agreement to Cancel or Modify

TWENTY-SECOND.—And it is further understood and agreed by and between the parties hereto that this agreement may be wholly cancelled or annulled, or from time to time be modified, as may be mutually agreed in writing, between said parties, or their successor or successors, anything herein contained to the contrary in any wise notwithstanding.

Adoption of Agreement by Both Parties

IN WITNESS WHEREOF the party of the first part has caused this agreement to be executed by its Mayor, and pursuant to a resolution of the Board of Estimate and Apportionment adopted at a meeting on the 10th day of December in the year of our Lord, 1909; and the said party of the second part has caused the same to be executed by its President and Treasurer and its official seal affixed thereto, pursuant to a resolution of the Board of Trustees of the Brooklyn Institute of Arts and Sciences adopted at a meeting held the 8th day of June in the year of our Lord, 1906.

GEORGE B. MCCLELLAN,
Mayor of The City of New York.

SEAL

A. AUGUSTUS HEALY,
President of the Brooklyn Institute of Arts and Sciences.

SEAL

G. D. FAHNESTOCK,
Treasurer of the Brooklyn Institute of Arts and Sciences.

ATTEST:
P. J. SCULLY,
City Clerk of the City of New York.

Approved as to form,
GEORGE L. STERLING,
Acting Corporation Counsel.

PUBLICATIONS IN THE CITY RECORD OF OFFICIAL ACTION TOUCHING THE CORPORATE STOCK BUDGET FOR THE BROOKLYN BOTANIC GARDEN

June 3, 1910. Board of Estimate and Apportionment (38:6352. Je 10 1910). Passage of *resolution* approving issue of corporate stock to amount not to exceed *$25,000 for construction of plant house.*

Passage of *resolution* approving issue of corporate stock to amount not to exceed *$25,000 for construction of rooms for instruction of botany.*

June 14, 1910. Board of Aldermen (39:7850. 18 S 1911) *concur* in above resolution of Board of Estimate and Apportionment.

June 28, 1910. Board of Aldermen (38:8009. Jy 27 1910). *An Ordinance* (paper No. 871) providing

for an issue of corporate stock of the City of New York in the sum of $25,000, to provide means for construction of plant houses.

An Ordinance (paper 872) providing for an issue of corporate stock of the City of New York in the sum of $25,000, to provide means for the construction of rooms of instruction of botany.

Board of Aldermen *approve* of and *concur* in first resolution above adopted by Board of Estimate and Apportionment on June 3, 1910.

The Mayor (July 19, 1910), returned papers 871 and 872 without either his approval or disapproval, and they therefore took effect as if approved by him.

See also Index to City Record for July, 1910, Vol. 38, Pt. 7, p. v.

July 11, 1911. Comptroller (39:7171. Ag 19, 1911).

Recommends to Board of Estimate and Apportionment the issue of Corporate Stock, as follows:

Erection of greenhouses, B. B. G.	$17,000.00
" " Instruction Building, B. B. G.	33,000.00
Permanent improvements	40,000.00
Roadways, walks, etc.	30,000.00

July 17, 1911. Board of Estimate and Apportionment (39:7173. 18 Ag 1911).

Resolution approving issue of corporate stock, as recommended by Comptroller on July 11, 1911.

July 27, 1911. Board of Estimate and Apportionment (39:7850-7851. 18 S 1911).

Amendment of resolutions adopted on July 17, 1911, so as to appropriate $17,000 "for construction of a *laboratory building and greenhouses,*" and similarly $33,000.00 "for

the construction of a *laboratory building and greenhouses.*"

The Secretary presented a communication from the Commissioner of Parks, Boroughs of Brooklyn and Queens, referring to the authorization of an issue of Corporate Stock on June 3, 1910, of $25,000, for the construction of Plant Houses and $25,000 for construction of Rooms for Instruction in Botany, and calling attention to the fact that "it will be extremely difficult to physically separate one part of the work from the other, owing to the fact that the heating plant provides heat for both the Instruction Building and the Plant Houses, and there are communications between the two.

Therefore, the Park Commissioner requests the Board of Estimate and Apportionment "to combine the two appropriations above mentioned into a single appropriation."

Amendment passed that the resolution of June 3, 1910, appropriating $25,000 "for the construction of rooms for instruction in botany," be amended so as to read "for the erection and construction of a laboratory building and greenhouses, including equipment thereof." Passed.

Amendment also passed that the resolution of June 3, 1910, appropriating $25,000 "for the construction of plant houses in the Botanic Garden and Arboretum," be amended so as to read "for the erection and construction of a laboratory building and greenhouses, including equipment thereof."

Thus the four separate authorizations were "lumped together to obtain economy in construction."

July 31, 1911. Board of Aldermen (39:6838-6839. 3 Ag 1911).

Approves and concurs in the above resolutions of June 17, 1911, so as to lump together four appropriations into one sum not to exceed $100.00. (Approved papers Nos. 1102, 1103, 1104, and 1105.)

August 30, 1911. Approved by Mayor (39:7714-7715. 12 S 1911.)

October 19, 1911. Board of Estimate and Apportionment. (39:8957. 25 O 1911.)

Department of Parks of Boroughs of Brooklyn and Queens requests and *Comptroller recommends approval* of contract, plans, specifications, as recommended, and estimate of cost ($52,035) for the erection of the first part of the laboratory building and greenhouses for the Brooklyn Botanic Garden. Items of cost as follows:

Preliminary expense, excavation and masonry	$17,000.00
Metal lathing, plastering and stucco	6,350.00
Marble and terrazzo, carpentry, kalsomined work and painting.	4,900.00
Structural and ornamental iron..	2,900.00
Roofing	700 00
Iron work, glazing and painting of plant house	5,900.00
Benches in plant house	750 00
Heating and ventilating	6,000.00
Plumbing	3,900.00
Electrical work	900.00
	$49,300.00
Architects' and engineers' fees...	2,735.00
	$52,035.00

Board of Estimate and Apportionment adopted a resolution *approving* "the form of contract, plans, specifications as amended, and estimate of cost in the sum of $52,035 for work under the jurisdiction of the Commissioner of Parks, Borough of Brooklyn, as follows:

"For all material and labor required for the erection of the first part of Laboratory Building and Greenhouses for the Brooklyn Botanic Garden and Arboretum," etc.

PUBLICATIONS IN THE CITY RECORD OF OFFICIAL ACTION TOUCHING THE TAX BUDGET APPROPRIATIONS FOR THE BROOKLYN BOTANIC GARDEN, FOR 1911.

Board of Estimate:

Approved October 31, 1910. (City Record, Nov. 15, 1910.)

Board of Aldermen:

Approved Nov. 22, 1910. (City Record, Nov. 29, 1910.)

The Mayor:

In papers approved week ending Dec. 24, 1910, as follows:

ITEMS OF THE TAX BUDGET OF THE BROOKLYN BOTANIC GARDEN, APPROPRIATED BY THE CITY OF NEW YORK FOR 1911.

Salaries and wages	$10,000.00
General supplies	4,000.00
Fuel	300.00
Telephone service	50.00
Contingencies	200.00

NOTES

The Garden was honored, on November 1, by a visit from Prof. W. L. Johannsen, Professor of Plant Physiology in the University of Copenhagen; and on October 23, by a visit from Prof. George F. Atkinson, Professor of Botany in Cornell University.

During November, 1910, Dr. Caroline Rumbold, special collaborator of the United States Department of Agriculture, consulted with members of the Garden Staff. Dr. Rumbold is assisting in the work of the Chestnut Blight Commission of Pennsylvania.

Fifteen seedlings and two larger saplings of the giant redwood, *Sequoia gigantea*, the gift of Mr. Alfred T. White, are doing well in the nursery.

The Garden Library has received a copy of the first edition (London, 1862) of Darwin's "Fertilization of Orchids," presented by Mr. Alfred T. White.

Messrs. McKim, Mead & White, architects of the Laboratory and Instruction Building and the plant houses, are preparing

the working drawings and specifications for the second portion of the conservatories to be constructed. This includes the central palm house, the southeast wings, and the service basement.

Among woodland plants, now rare or unknown near the vicinity of Brooklyn, that were cultivated in the Garden during the past season, the following were in full flower on the dates specified: Blue cohosh (*Caulophyllum thalictroides*), 12 May; moccasin flower (*Cypripedium acaule*), 19 May; showy ladies' slipper (*Cypripedium reginæ*), 11 June; golden seal (*Hydrastis canadensis*), 11 May; bishop's cap (*Mitella diphylla*), 19 May; and wake-robin (*Trillium erectum*), 10 May. Besides these, the Virginia snakeroot (*Aristolochia serpentaria*), May-apple (*Podophyllum peltatum*), and three species of ground-pine (*Lycopodium*) were also successfully cultivated. It is planned to grow these woodland plants more extensively the coming season in an environment suited to plants of this nature.

At a meeting of the Board of Park Commissioners of New York City, on November 23, 1911, bids were submitted as follows:

Bids for the construction of the First Section of the Instruction Building and the First Portion of the Plant Houses, together with heating apparatus in the Brooklyn Botanic Garden.

P. M. O'Brien	$63,300
John B. Shean & Co	68,080
Kelly & Kelly, etc	69,130
P. J. Carlin Construction Co	65,740
H. C. Stokes Construction Co	69,300
Cockerill, Little & Co., Incorporated	55,800
J. M. Knott	66,483
Benedetto & Egan Construction Co	60,453

None of these bids came within the estimate ($52,035.00) of the architects, and the contract was not awarded.

In Memoriam

GEORGE CALLENDER BRACKETT

Born September 6, 1838

Life Member of The Brooklyn Institute of Arts and Sciences
1890-1911
Member of the Board of Trustees 1891-1911
Secretary of the Board of Trustees 1898-1911
Member of the Committee on Botanic Garden 1905-1911

Deceased May 21, 1911

The Brooklyn Institute of Arts and Sciences

PROF. FRANKLIN W. HOOPER, *Director*.

Ex Officio Members of the Board of Trustees

THE MAYOR OF THE CITY OF NEW YORK,
HON. WILLIAM J. GAYNOR.

THE PRESIDENT OF THE BOROUGH OF BROOKLYN,
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Committee on Botanic Garden

ALFRED T. WHITE,

GATES D. FAHNESTOCK,
GEORGE D. HEARN,
GEORGE D. PRATT,
WILLIAM A. PUTNAM.

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BROOKLYN BOTANIC GARDEN RECORD

VOL. I — APRIL, 1912 — / — No. 2

EDITED BY
C. STUART GAGER

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PUBLISHED QUARTERLY FOR THE GARDEN
BROOKLYN, N. Y.

Botanic Garden Staff

DR. C. STUART GAGER, *Director*

MR. NORMAN TAYLOR, *Curator of Plants*

MISS BERTHA M. EVES, *Secretary and Librarian*

MR. HAROLD A. CAPARN, *Consulting Landscape Architect*

MR. JOHN V. BORIN, *Head Gardener*

MR. HERMANN KOLSH, *Foreman Gardener*

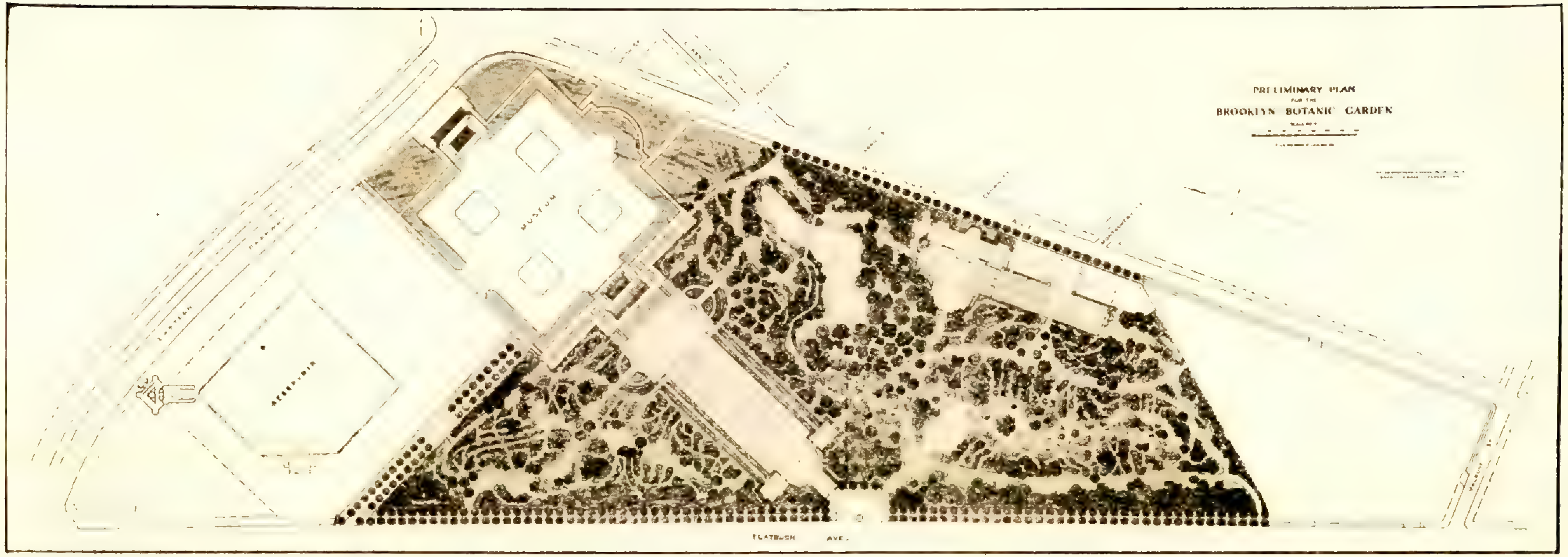

FIG. 6. BROOKLYN BOTANIC GARDEN. Preliminary plan of the grounds.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

Vol. I | Brooklyn, N. Y., April, 1912 | No. 2

FIRST ANNUAL REPORT OF THE BROOKLYN BOTANIC GARDEN, 1911

REPORT OF THE DIRECTOR FOR JULY 1, 1910 TO DECEMBER 31, 1911

To the Committee on Botanic Garden:

Gentlemen:—I have the honor to submit herewith the first Annual Report of the Brooklyn Botanic Garden of The Brooklyn Institute of Arts and Sciences. This report covers the period from July 1, 1910, the date when my appointment took effect, to December 31, 1911.

Temporary Headquarters

Until October 1, 1910, temporary desk room was provided by Prof. Franklin W. Hooper, Director of The Brooklyn Institute of Arts and Sciences, at the offices of the Institute, in the Academy of Music building. Since that date temporary offices have been provided in the Central Museum building of The Brooklyn Institute Museums, on Eastern Parkway. During the first two months my time was occupied with getting into touch with the local situation, and with other matters incidental to the initial work of establishing the Garden, including the preparation of the tax budget for maintenance for 1911.

Building Plans and Appropriations

Before coming to Brooklyn I had prepared preliminary plans for the laboratory and instruction building, and for the plant houses, and during the summer and fall I was in frequent consultation with Mr. B. L. Fenner, of McKim, Mead & White, architects for the buildings, and with various builders of greenhouses. After a thorough study of the different makes of greenhouses, it was decided that the Pierson U-Bar type of construction was the most satisfactory one for our purposes, and my recommendation that this be approximated as nearly as possible in our plant houses met with your approval, and our final plans have been made accordingly.

On February 14, 1910, at the recommendation of the Institute, the Park Commissioner for the Boroughs of Brooklyn and Queens made application to the Board of Estimate and Apportionment and to the Board of Aldermen of New York City, for the issue of corporate stock of the city to the amount of $100,000. It was further requested that one-half of this amount be made available in 1910, and the remainder in 1911. As our plans progressed it was found that only the northeast wing of the plant houses, the southern pavilion of the building, and the underground heating plant between the two could be constructed for a sum not exceeding $50,000. A memorandum of subsequent legislation which finally made available the entire amount of $100,000 to be used as desired, for the building and plant houses together, was published in the Brooklyn Botanic Garden Record (1: 16-20. Ja 1912).

The general plans for our buildings met with the approval of your Committee, of the Municipal Art Commission, and the Commissioner of Parks, and working drawings and specifications for the portions first to be constructed, prepared by the architects, were passed upon favorably by the city departments concerned, and advertised for bidding during October-November, 1911.

At the meeting of the Board of Park Commissioners on November 23, 1911, bids were submitted by eight different firms of contractors. The architects' estimate for this work was $52,035; the highest bid was $69,300, and the lowest, $55,800. On December 12, 1911, the Commissioner of Parks of the Borough of Brooklyn requested approval of $55,800 as a new esti-

mate of cost. A resolution to this effect was recommended to the Board of Estimate and Apportionment for adoption by the Comptroller, Mr. Wm. A. Prendergast, on December 29, 1911.* Up to December 31, 1911, the contract had not been awarded.

*The resolution was adopted by the Board at its meeting of January 4, 1912 (*City Record*, **40**:256. 11 Ja 1912).

Grounds

In pursuance of the written agreement of December 28, 1909, between the City of New York and The Brooklyn Institute of Arts and Sciences, an area comprising 39+ acres, lying south of the Brooklyn Institute Museum, and between Flatbush and Washington Aves., was turned over to the Institute for the purpose of botanic garden. The full text of this agreement, including the exact boundaries of the Garden lands, is published in the BROOKLYN BOTANIC GARDEN RECORD (**1**:7-16. Ja 1912).

As stated in the Report of the Curator of Plants, appended hereto, the Garden lands were received from the Department of Parks in an excellent state of up-keep, and the details of the year's work in caring for the grounds are also contained in the Report of the Curator of Plants.

Previous to July 1, 1910, a topographic survey of the Garden area was prepared by D. Barta & Co., and during the fall of 1910, the firm of Olmsted Bros., of Brookline, Mass., were appointed landscape architects to lay out the grounds. After approval by Mr. Samuel Parsons, the then Landscape Architect of the Department of Parks of New York City, the plan submitted by Olmsted Bros. was adopted in its broader outlines by both the Institute and the Commissioner of Parks of the Borough of Brooklyn. The details are still under discussion.

In harmony with the adopted plan, a new concrete walk was constructed during April-May, 1911, leading from the museum embankment west of the flagpole at the south border of the grounds. This walk was west of the old walk which was obliterated and the surface regraded. A gravel path was also constructed leading from the new concrete walk southward to the main entrance path, near Flatbush Ave., and a branch path

leading east of this, parallel to the museum embankment and in part along the northern edge of the future esplanade. This involved the obliteration of a portion of paths already existing. The work may be regarded as our first step toward realizing the new plan, and greatly facilitated our gardening operations, as well as affording necessary approaches to our Economic and Local Flora Sections.

The Garden First Opened to the Public

With the consent of the Commissioner of Parks of the Borough of Brooklyn, the grounds were kept closed from February 1 until May 13, 1911, including the period of the initial installation of the various plantations, and on the latter date (the date, old style, of the birthday of Linnaeus), the Garden was formally opened to the public. Temporary gate signs were placed at each of the seven entrances,—four on Flatbush Ave., two on Washington Ave., and one west of the museum building on Eastern Parkway.

Soil Improvement

In addition to the horticultural operations, and the care of the paths and lawns, attention was given to the improvement of the soil of the central meadow, an area of approximately 8 1/5 acres. Most of this area was "made" ground, and the soil was so poor that much of it would produce little but weeds. According to estimates submitted by landscape architects for improving the soil of the Garden by the method of top-soiling, it would have cost $50,000, more or less, to top-soil the area of the central meadow. While this method is the quickest, it is unscientific and also the most expensive. For both of these reasons it seemed desirable to employ cultural methods, and the advice of a soil expert from the Federal Bureau of Soils, at Washington, was sought. The outline of treatment prescribed by him, after carefully examining the area, is given in detail in the appended Report of the Curator of Plants. As soon as this work was undertaken "blanket labels" were prepared, as an educational feature, briefly outlining the needs, aims, and methods of soil improvement. One of these labels was placed at each of the four corners of the meadow, and they were daily read, and apparently carefully read, by the large majority of

the visitors to the grounds. These labels had not only the positive educational merit of giving the public accurate information concerning scientific methods of soil treatment, but also undoubtedly had the effect of thwarting adverse criticism of the, at times, necessarily somewhat untidy appearance of the area. These soil improvement operations will be completed during 1912. It should be emphasized here that the total cost of all the soil improvement work done during 1911 on this meadow, including labor and the purchase of fertilizer, was only $1,303.64. The work remaining to be done in 1912 in order to complete the job will cost about as much again, so that the total expense will probably not greatly exceed $2,600, as against $50,000, the estimated cost of top-soiling.

Custodianship of the Grounds

In paragraph 12 of the agreement between the City of New York and the Institute it is specified that the City shall provide adequate police protection for the Garden. On every Sunday and holiday, in addition to the regular officer detailed, the grounds have been placed in the custody of the head gardener, with three assistants, each two of the four men being on duty alternately. By this arrangement, not only is the opening and closing of the grounds and the watering of the plants provided for on Sundays and holidays, but visitors find a properly qualified representative of the Garden to answer inquiries concerning the plantations and other Garden matters. By this arrangement, also, such supervision or oversight of our collections and other property is assured as would not properly come within the province of the police officer. Appropriate uniforms have been provided for Garden officials when thus on duty. On days other than Sundays and holidays the grounds are in the immediate care of the head gardener and aids, and other Garden officers are also present.

Hours of Opening and Closing

On account of the unusual nature of our planting, it is essential to exercise much closer supervision of the grounds than is needed in an ordinary city park. In this connection it is necessary for us to control, as far as possible, all entrance and exit. The hour of opening has been fixed at 8 A. M., and of closing

at one-half hour before sunset, these hours having been found to afford satisfactory accommodation to the public. Between the hours of closing and opening the gates are kept locked.

Labels

A botanic garden is, in effect, an out-of-doors museum, and therefore its aims and treatment must differ greatly from those of a public park or a mere pleasure garden. The latter serve primarily as centers of recreation, and aim to give pleasure through pleasing horticultural and landscape effects. A botanic garden is fundamentally an educational institution, and while of necessity serving some of the purposes of a park, and aiming definitely to be as attractive as possible, it has certain limitations which would not ordinarily be felt by the landscape architect, or in purely horticultural operations. For example, in a botanic garden, plants cannot always be massed on the basis of color effects, but must be grouped in accordance with their botanical relationships. This often necessitates a certain amount of disregard for stature, color, and time of flowering. Again, while some of the planting may serve purely horticultural ends, much of it must be planned primarily with reference to educational purposes, to convey information about the various phases of plant life. These collections must be labeled, and to do this so that the labels will not be more conspicuous than the plants themselves, or detract from the good appearance of the beds, is not an easy matter. After considerable experimenting, with the assistance of Mr. W. M. Sargent, a local sign writer, we have finally arrived at a fairly satisfactory type of label for the beds and the individual plants. Still there is much to be desired in the way of finish and durability, and we are now investigating various materials and methods with this end in view.

In addition to bed and plant labels, such as are commonly used in botanic gardens, larger labels have been prepared, containing as many as three or four concise paragraphs of reading matter, and, for want of a better name, called "blanket labels." Each of these labels gives information about an exhibit as a whole. Thus we have one for the native wild flower garden (Local Flora Section), containing a map of the range, and gen-

eral information about the distribution of plants within 100 miles of the Garden. Another covers briefly the subject of insectivorous plants, of which we have had nine different species under cultivation during the year. Similar labels were placed for both divisions of the Morphological Section. These labels give unity to the various plantations, increase their educational value, and are of especial advantage to teachers with classes.

Classification of Plantations

Exotic plants, suitably labeled, and arranged primarily according to botanical ideas and principles, will be exhibited in the Plant Houses. For the hardy sorts, to be grown out of doors, the following arrangement has been adopted:

I. Systematic Section.

Hardy herbaceous plants, arranged in beds according to their natural affinities.

II. Local Floral Section.

Herbaceous and woody plants growing without cultivation within a radius of 100 miles of New York City.

III. Morphological Section.

A. External Anatomy.

B. Comparative Morphology.

IV. Ecological Section.

Illustrating the home-life of plants, and their adjustment to their surroundings.

V. Evolution Section.

Illustrating various facts of Variation, Inheritance, Artificial and Natural Selection, Struggle for Existence, and Survival of the Fittest.

VI. Economic Section.

A. Foods and Condiments.

B. Medicinal and Poisonous Plants.

C. Fibre Plants.

VII. Weed Section.

Showing the characters of weeds.

VIII. Formal Garden Section.

In front of the Laboratory Building and Greenhouses.

IX. Arboretum.

A collection of trees, native and exotic.

X. Fruticetum.

A shrub collection.

Of these sections, as stated in the report of the Curator of Plants, the installation of numbers II, III, VI, and X was commenced during 1911.

Organization by Departments

The departmental organization of the Garden, which it will be the aim to realize as rapidly as possible, is as follows:

1. Administration:—

The Director of the Garden.
Director of the Laboratories.
Curator of Plants.
Curator of Public Instruction.
Librarian.
Consulting Landscape Architect.
Secretary.
Accountant.
Superintendent of Buildings and Grounds.
Janitors and Night-watchman.
Engineers and Firemen.
Foreman.
Laborers.

2. Graduate Study and Research:—

The Director of the Garden.
Experimental Evolution and Plant Breeding.
Plant Physiology.
Plant Pathology.
Plant Morphology.
Forestry and Forest Botany.
Herbarium.
Fellows and Resident Investigators.

3. Public Instruction:—

Curator of Public Instruction.
Instructor.
Docent.
Supply Department.

4. Plantations and Greenhouses:—
    Curator of Plants.
        Head Gardener.
            Gardeners.
            Greenhouse Aids.
                Labeler.
5. Library:—
    Librarian.
        Library aid.
6. Publications:—
    Editor-in-Chief.
7. Miscellaneous:—
    Director of the Laboratories.
        Preparator.
        Photographer.
        Artist.
        Technician.

I have already submitted for your consideration a plan of development by which this organization may be largely realized within five or six years.

Appointments

During 1911, in addition to day laborers, four appointments were made, as follows:

January 1. Miss Bertha M. Eves, Secretary and Librarian. Miss Eves was for six years Secretary in the departments of botany and horticulture, and Librarian of the departmental library, in the University of Missouri, Columbia, Mo., and for fourteen months, Secretary of the State Agricultural Experiment Station, Gainesville, Florida.

March 16. Mr. Norman Taylor, Curator of Plants. Mr. Taylor was for six years connected with the New York Botanical Garden, being Custodian of the Plantations from 1907 to 1909, and Assistant Curator from 1909 to the date of his appointment to the staff of the Brooklyn Garden. Mr. Taylor has been at work for a number of years on a phytogeographical study of the local flora, embracing the Torrey Botanical Club range,

and has continued this investigation during the past year. The thanks of our Garden are due to the New York Botanical Garden for many herbarium and library courtesies extended to Mr. Taylor in connection with this investigation.

Mr. Taylor has been for one year editor of *Torreya,* one of the monthly magazines of the Torrey Botanical Club, and his appointment to our staff brings the editorial office of this magazine to the Brooklyn Garden.

April 1. Mr. John V. Borin, Head Gardener. Mr. Borin has had six years' experience at the New York Botanical Garden, and considerable experience previous to that with nurserymen and on private places.

April 1. Mr. Herman Kolsh, Foreman Gardener. Mr. Kolsh has had several years' experience at the New York Botanical Garden and previously at private places. His practical experience in farm work made his services specially valuable in connection with our soil improvement operations.

Investigations

In the agreement of December 28, 1909, between the City of New York and The Brooklyn Institute of Arts and Sciences, it is provided that members of the Garden staff "shall make botanic researches from time to time and that they shall labor to the best of their ability for the advancement of botanical science;" and in harmony with this it is further provided, "that a limited space in the building containing the rooms for instruction be designated by the party of the second part to be used exclusively for research purposes."

In accordance with the spirit of these terms, ample provision has been made in the plans of our laboratory and instruction building for investigation. Twelve private research rooms are planned, in addition to dark rooms, a constant temperature room, and an experimental house in the conservatory range. The plan of organization of the Garden, as given above, includes a department of Graduate Study and Research, and this department will be of first importance as fundamental to all other activities of the Garden. It will give solidarity and balance, inspiration and accuracy, new material and breadth, and higher scholarship to our elementary instruction, and to all our work

of popularizing through exhibits, publications, field trips, and public lectures. Without it, it would not be possible to develop a botanic garden in any large sense of the word. It is the only adequate source of life for any institution that has for one of its aims the advancement of any branch of science, and the inclusion of a proviso for research work in our agreement with the city is a piece of very good fortune, indicating on the part of the framer and signatories of this agreement a broad and gratifying conception of what the aim and work of a botanic garden should be.

Not only will the Garden itself benefit from investigation, but in this connection it should be enabled to render frequent and valuable service to the Borough of Brooklyn, and indeed to the entire greater city. Our members of staff are paid by city appropriations, and the knowledge of our plant pathologist, plant physiologist, or other experts that may be appointed, should be freely at the disposal of any municipal department so far as is consistent with their Garden duties.

As to the research work accomplished during 1911, it may be said that administrative duties have necessarily occupied the larger portion of the time of the Director of the Garden, but two or three pieces of research have been accomplished. These include an exhaustive study of The Condition and Causes of Injury to Vegetation along the North Shore of Staten Island, and two minor pieces of work, one embodied in a paper entitled "Cryptomeric Inheritance in Onagra," and the other on "Ingrowing Sprouts of *Solanum tuberosum*," now being prepared for publication.

The Curator of Plants, Mr. Taylor, has continued his studies on the local flora, and his experience with native plants, in connection with this work, has been of great advantage to the Garden, and is reflected, among other ways, in the nature and content of our Local Flora Section.

One registered investigator was recorded during the year, Mr. C. B. Case, of India, a graduate student in Columbia University, with temporary residence in Brooklyn, who has availed himself of our equipment in his studies in the breeding of rice. We have had under cultivation some eight or ten different varieties of the rice plant, and this investigation has in it the possi-

bilities of economic as well as of scientific importance. The Garden has, in this connection, again been placed under obligations to the Commissioner of Parks, the Hon. Michael J. Kennedy, for placing at our disposal sufficient greenhouse space in his already crowded quarters, for continuing the cultivation of some of the rice plants during the winter.

Phenological Records

Phenology (or phenomenology) is the branch of science which has to do with the *appearances* of biological activities. As applied to plant life, it is concerned with the dates of blossoming, appearance of leaves, leaf-fall, ripening of fruit, or other similar phenomena, which are an expression of the march of the seasons. In reality a phenological record is a record of climate in terms of the periodic activities of plants and animals, and such a record, when extending over a period of decades, becomes very valuable from the standpoint of both botany and climatology.

Suitable blank forms for recording phenological data have been printed according to copy prepared by the Curator of Plants, and as stated in his report, a beginning has been made in these records. They will be especially valuable in connection with the meteorological records which will shortly be commenced in the Garden.

Consultation

It is the aim of the Garden to be of as much service as possible to all citizens of Brooklyn, and the members of our staff hold themselves in readiness at all times to answer questions about plants, identify specimens, or render any other appropriate service. Numerous opportunities of this nature have come to us during the past year, and at times from teachers in the public schools. As the Garden becomes better known this work will doubtless increase.

Arbor Day Exercises

In connection with the meeting of April 27, 1911, of the American Association for the Planting and Preservation of City Trees, an Arbor Day tree was planted in the Garden with brief remarks by the director *à propos* of the occasion. It will be

desirable to make Arbor Day exercises an annual event at the Garden, preferably in co-operation with the public schools; and trees, shrubs, or vines planted on such occasions should be appropriately labeled.

The Library

In the report of the Secretary and Librarian, appended hereto, it is pointed out that the library has grown fully as much as the space at our disposal would permit, and in accordance with our more immediate needs. Record should be made here of the very desirable action taken by the Committee on Botanic Garden at its meeting of November 9, 1911, that "as far as practicable, all books purchased for the library of the Botanic Garden, and all binding of books, should be paid for from private funds, and become entirely the property of the Institute." The library, however, will be administered as a public, non-circulating library, open without charge to all properly qualified citizens.

The Librarian's report shows a total of 266 books and several hundred pamphlets received during the year.

Public Lectures and Addresses

Public lectures and addresses have been delivered as follows:

April 27. Addresses on "Trees in our daily life," before the meeting of the American Association for the Planting and Preservation of City Trees, at the Central Museum Building.

May 5, morning. Address on "The significance of trees," before the teachers and pupils of the Girls High School Annex, Brooklyn.

May 5, afternoon. Arbor Day address before the faculty and students of the Normal School at Jamaica, L. I.

May 9. Public lecture on "What is botany?" at the New York Botanical Garden, Bronx Park.

September 9. Lecture on "Plants and people of Pinar del Rio, Cuba," at the New York Botanical Garden.

September 29. Address before the Brooklyn Training School for Teachers, on "Manners and customs in Cuba."

October 28. Conference and address on "The Brooklyn Botanic Garden," before the members of the Department of Botany of The Brooklyn Institute of Arts and Sciences, in the Science Room, Academy of Music, Brooklyn.

November 16. Lecture on "Exploration in Cuba (1)," before members of The Brooklyn Institute of Arts and Sciences, Lecture Hall, Academy of Music.

November 23. Lecture on "Exploration in Cuba (2)," as on November 16.

Public lectures have also been given by Mr. Taylor, as follows:

December 14. "Explorations in the Bahamas," before members of The Brooklyn Institute of Arts and Sciences. Lecture Hall, Academy of Music.

December 21. "Explorations in Santo Domingo," as on December 14.

Mr. Taylor is also a member of the lecture staff of the Board of Education of New York City, and in this connection has given six lectures on travel at various lecture centers, including all five boroughs.

Courses of Instruction

Two courses of instruction have been given by the Director of the Garden during 1910-11, at the Academy of Music building, in co-operation with the Department of Botany of the Brooklyn Institute, as follows:

October 15, 1910—January 6, 1912. Ten lectures on plant physiology, on successive Saturday mornings, at 10 o'clock, omitting November 26 and December 24 and 31. This course was open without charge to teachers in the public and private schools of the city, and to all members of the Institute.

March 4—May 13, 1911. A course in the teaching of botany, given on ten consecutive Saturday mornings, at 10 o'clock, omitting April 15. Open without charge to all teachers or to those intending to become teachers.

Scientific Papers

The following papers have been presented by the Director of the Garden before different societies:

November 25, 1910. "The purpose of an introductory course in botany," read before the Association of Colleges and Preparatory Schools at its twenty-fourth annual convention, Lehigh University, South Bethlehem, Pa.

December 28, 1910. "Cryptomeric inheritance in Onagra," read by title before the Botanical Society of America, at Minneapolis, Minn.

January 16, 1911. "Cryptomeric inheritance in Onagra," read before the Biological Section of the New York Academy of Sciences, American Museum Building, New York City.

December 29, 1911. "Ingrowing sprouts of *Solanum tuberosum*," read before the Botanical Society of America, Washington, D. C.

Field Meetings

In co-operation with the Department of Botany of the Brooklyn Institute, field meetings have been conducted by the Director, as follows:

May 27, 1911. At Prospect Park, and the Brooklyn Botanic Garden.

September 16, 1911. At the library, laboratory, and conservatories of the New York Botanical Garden.

Garden Publications

At the meeting of your Committee on February 16, 1911, the establishment of the following publications was authorized:

1. *Memoirs.* Larger and more formal papers and monographs, each title to constitute a separate volume.

2. *Contributions.* Papers originally published in botanical or other periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume.

3. *Record.* An administrative, serial publication, to contain, among other things, the annual report of the Director and heads of departments, special reports, announcements of courses of instruction, miscellaneous papers, and notes concerning Garden progress and events.

4. *Guides* to the collections, buildings, and grounds.

During 1911 three numbers of the Contributions have been issued, and manuscript for a fourth prepared. The copy for volume 1, number 1, of the RECORD is now in the hands of the printer. The other two publications have not yet been started.

Publications of Members of Staff During 1911

Gager, C. Stuart. The educational work of botanic gardens. Cyclopedia of Education. Pp. 421-425. New York. The MacMillan Co. 1911.

Ditto. Reprinted in the Jour. N. Y. Bot. Gard. **12**: 73-85. 1911. Reissued separately as Brooklyn Bot. Gard. Contrib. No. 1.

———The purpose of an introductory course in botany. Proc. 24. Ann. Convention Assoc. Colleges and Prep. Schools of the Middle States and Maryland. **1910**: 58-65. 1911. Reissued as Brooklyn Bot. Gard. Contrib. No. 2.

———Discussion (of preceding paper.) *Ibid.* p. 80.

———Ganong's The Teaching Botanist, Ed. 2. (Review.) Torreya. **10**: 208-210. 23 S 1910.

———The Brooklyn Botanic Garden. Jour. N. Y. Bot. Gard. **11**: 190-191. Ag 1910.

———"Biology." Science N. S. **34**: 407. 29 S 1911.

———The Mutation Theory (Review). Science, N. S. **34**: 491-493. 13 O 1911.

———Duggar's Plant Physiology (Review). Torreya. **11**: 214-217. O 1911.

———Cryptomeric Inheritance in Onagra. Bull. Torrey Club. **38**: 461-471. O 1911. Reissued as Brooklyn Bot. Gard. Contrib. No. 3.

———Scott's Evolution of Plants (Review). Torreya. **11**: 236-239. N 1911.

Taylor, N. Local Flora Notes—9. Torreya. **11**: 170-174. Ag 1911.

———The fertilization of the eel-grass. Torreya **11**: 184-186. S 1911.

———Local Flora Notes—10. Torreya. **11**: 186-189. S 1911.

———Harshberger's Phytogeographic Survey of North America (Review). Torreya. **11**: 190-199. S 1911.

———Some flowers that endure frost. Garden Mag. **14**: 160-161. N 1911.

Names of Botanists for the Laboratory and Instruction Building

The plans for the treatment of the exterior of our laboratory and instruction building include the placing of the names of former botanists of note on the frieze and on panels under the windows. In order to avoid local personal bias and also to secure a wide expression of contemporary opinion as to relative merit, an extensive canvass has been made of American botanists for votes for these names, as authorized by your Committee on February 16, 1911.

The response to our request for votes has been very gratifying, has shown (and doubtless served incidentally to increase) a widespread interest in the Garden, and will result in a much more satisfactory choice of names than could have been obtained in any other way. A full report of this canvass is now in preparation.

Gifts

The following gifts have been received during the year:

April 12. From Mr. Lowell M. Palmer, 438 evergreens, embracing a large number of different species and horticultural varieties.

April 26. From Mrs. Charles Ulmer, one plant of *Euphorbia splendens.*

May 9. From Mr Alfred T. White, 17 young trees of *Sequoia gigantea.*

Oct. 25. From Mr. Henry Hicks, of Isaac Hicks & Son, 77 sapling trees, representing as many different species and horticultural varieties, and 37 genera.

Nov. 10. From Mr. Clarkson Cowl, of Great Neck, L. I., two palms (*Livistona* Sp.), and two screw-pines (*Pandanus utilis*).

As noted in the report of the Secretary and Librarian, 68 bound volumes and a large number of pamphlets have been presented to the library. These include a copy of the first edition of Darwin's "Fertilization of Orchids," presented by Mr. Alfred T. White; Lindley's "The Vegetable Kingdom," presented by the late Mr. George C. Brackett; and a number of volumes and pamphlets presented by Mrs. Annie Morrill Smith.

FIG. 7. A portion of the Nursery, showing the evergreens given by Mr. Lowell M. Palmer.

Lantern Slides

The contemplated work of popular lectures and instruction will necessitate the preparation of a large collection of lantern slides for purposes of illustration. During the year 310 slides have been made, practically all of which are from negatives owned by the Garden, so that the collection is unique. One hundred twenty-five (125) of these are colored slides, all but five being of native wild plants, including trees, colored by Miss E. M. Kittredge, and made from negatives taken by her especially for the Garden. Miss Kittredge combines with an unusual artistic ability, an accurate knowledge of the local flora. With each negative, she has submitted for our confirmation the specimen from which the negative was made, and also a colored print. In this way we are sure, not only that the determination of the species is correct, but also that the coloration is accurate. Thus the collection of slides possesses, not only rare beauty, but scientific accuracy, without which it would have little value for the purposes of a botanic garden.

Recommendations

Library. The very wise decision of your Committee to build up the library with private money brings us face to face with the need of a special book fund, at least during the early period of development. The annual income from our endowment of $50,000 is only $2250, and the demands upon this fund for the purchase of plants and for other purposes will be specially heavy for the first two or three years, leaving only a small balance for library purposes. I beg to suggest the desirability of considering as soon as possible some plan for securing private funds for the purchase of books and periodicals. As soon as we come into possession of our own building, from $5000 to $10,000 could be profitably expended for a nucleus for the library. In fact, without such a fund, the development of the library will be seriously handicapped.

Staff. In planning for the further development of the Garden during 1912, I wish to recommend that the next appointment to the staff be a curator, to have charge of the department of Public Instruction. The state of progress of our building plans

will render it not advisable to make this appointment before the fall of 1912.

Propagating House. It is already clearly evident that, within a very short time after the completion of our plant houses, their entire space will be needed for our exhibition collections, and the work of instruction and investigation to which two of the houses are now assigned. This will necessitate the erection of a propagating house where the collections may be suitably prepared and cared for, and it will also become increasingly urgent that we have a garden area adjacent to the propagating house for nursery and experimental purposes. The location of the Garden with relation to Prospect Park, the Central Museum, and public thoroughfares, leaves no appropriate place within the present grounds for such a house and garden, and I wish to urge upon the Committee the desirability of giving early consideration to this need, with a view, if possible, to acquiring forthwith, and as near to the present Garden lands as may be, a suitable area for the purposes above named.

Acknowledgments

The thanks of the Garden are due to Mr. John McCallum, Mrs. Clayton A. Peters, and other members of the Department of Botany of the Brooklyn Institute, for gifts of living plants for the native wild flower garden.

Mention has already been made of the hearty co-operation of the New York Botanical Garden, through its Director-in-Chief, Dr. N. L. Britton; of the many courtesies extended by Dr. Frederick A. Lucas, former Curator-in-Chief, and Mr. E. L. Morris, Acting Curator-in-Chief, of the Brooklyn Institute Museums, and by the Hon. Michael J. Kennedy, Commissioner of Parks, Borough of Brooklyn. For valued services rendered, the Garden is also indebted to Mr. A. Augustus Healy, President, and other members of the Board of Trustees of the Brooklyn Institute, to Prof. Franklin W. Hooper, Director of the Institute, to the members of the Committee on Botanic Garden, and especially to the Chairman of this Committee, Mr. Alfred T. White, without whose substantial support and counsel the year's progress would not have been possible.

Accompanying Papers

I beg to submit herewith copies of the annual reports of the Curator of Plants, and of the Secretary and Librarian, and also an annual financial statement.

Respectfully submitted,

C. Stuart Gager,
Director of the Garden.

FIG. 8. Area of the Local Flora Section (*Native Wild Flower Garden*), April 3, 1911.

FIG. 9. Native Wild Flower Garden, Aug. 14. 1911. Cf. FIG. 8

REPORT OF THE CURATOR OF PLANTS FOR 1911

DR. C. STUART GAGER, DIRECTOR.

Sir: I have the honor to submit herewith my report as Curator of Plants from the date when my appointment took effect, March 16, 1911, to December 31, 1911. In view of the fact that this is the initial record of work done in the department, and owing to the desirability of putting in permanent form some historical data appertaining to the grounds and the contents thereof, it will be necessary to make this more extensive than subsequent reports may be.

Preliminary Work

Most of my time between March 16 and April 1 was spent in consultation with you as to the plans and specifications for the collections to be installed during the season, in the preparation of orders for the various nurserymen, and in arranging for the labeling of the plants. After your decision as to how many Sections of the ten now contemplated were to be installed during 1911, work immediately began upon these. Before considering them in detail, it will be desirable briefly to outline some general work incident to the opening up of horticultural operations.

The grounds were for the most part in a good state of up-keep and reflected great credit on the previous management of the Park Department authorities. After cleaning and raking up leaves, *et cetera,* from fence corners and walks, burning over the grass, and partially trimming the shrub planting along Flatbush and Washington Avenues, a nursery comprising about one acre was prepared near the southern end of the grounds. This was made necessary by the gift of Mr. Lowell M. Palmer of 438 evergreens, which we could not place permanently, and also to accommodate other shrubs and trees acquired by gift or purchase. One section of the nursery is devoted to herbaceous plants, temporarily stored there until the collections for which they are intended shall be installed.

A few of the trees on the grounds were pruned and otherwise cared for and 141 dead evergreens and 47 dead deciduous trees and shrubs were removed. The tool house, which was used by the previous custodians of the grounds, was transferred from its location near the main entrance on Flatbush

Avenue to the eastern side of the Garden, where it was hidden among some pine trees along the Washington Avenue side of the grounds. A new one was also built for our increased number of tools and implements, and a cold frame was constructed near by for the seed beds, and to serve as temporary propagating headquarters.

On reporting upon the installation of the three collections which were started during the year, they will be considered in the order in which they were begun.

The Morphological Section (Section III)

According to specifications drawn up by you for this collection, there are 43 beds, 36 of which were made ready for plants, the remainder to be installed during 1912. In the 16 beds devoted to "external anatomy" (Division 1), most of the plants needed were set out, some necessarily being omitted for the present, until we are equipped for growing greenhouse plants. The 20 beds illustrating "comparative morphology" (Division 2), were also filled in as far as our present equipment will allow. Other plants for these beds have been collected during the year, and notes made for the completion of the collection in the near future. It would be desirable to replace, in so far as possible, plants now in the collection which are of transient duration or difficult of cultivation, for plants of more easy cultivation and greater length of life, so that the utility of the collection may be kept at its greatest and the cost of maintenance reduced to a minimum. There are few collections in the Garden of such permanent tenure as this, and the aim should be to install only those plants which, while adequately illustrating the particular feature in hand, will demand the least amount of maintenance expense possible.

During the season 4 "blanket" labels or bulletins, 36 bed labels, and 203 individual plant labels were put in place, all of which will be discussed later under the heading *Labeling*.

Economic Section (Section II)

This collection was planned according to specifications drawn up by me before I came to the Garden, and approved by you. The plants used and their arrangement was determined

after consultation with Mr. George V. Nash, of the New York Botanical Garden, to whom my best thanks are due for many helpful suggestions. Twelve beds are devoted to food and fodder plants, four to medicinal plants, two to condiments and relishes, and one to fibers,—nineteen in all. Most of the plants called for in the outline of the plantation were grown very successfully during the past season, and it is hoped to complete the installation when greenhouse accommodation becomes available. The ultimate aim in this section of the Garden should be to include all plants that are of general use, together with information as to their origin, introduction, cultivation, evolutionary history, and other interesting data, suitably arranged for the education of the public. Because of the uncertainty as to path lines and doubt as to whether the place chosen would be the permanent one for the collection, none of the 75 shrubs included in the plantation outline were planted. During 1912 it would be very desirable to put these in, and to make some minor changes so that the collection will be complete and the arrangement permanent as soon as possible. The growing of the wild ancestors or closely related wild species near each of our common fruits and vegetables is contingent only on adequate glass-house protection for the starting of seedlings, as seeds of most of them can be procured from the Old World gardens. This feature would greatly increase the educational value of the collection. The labels for this collection were of a general and temporary nature only, the uncertainty as to final arrangement not making it desirable to label the individual plants permanently this year. The number of different kinds of plants grown in this section during the year was 165.

Native Wild Flower Garden (Section II)

This section of the Garden, situated at the northwestern end of the grounds, comprises a small valley about 600 feet long, with gently sloping sides, and a border mound of shrub planting along the Flatbush Avenue side. The whole area was in a bad condition, having in the past been used as a dump for stone screenings and other rubbish, and many local irregularities in the ground made it necessary to resurface most of the valley. The stones and other refuse were carted away and top soil from the

site of the proposed laboratory building was brought in. Some of the area was sodded, but the larger part was seeded down.

I had previously prepared a check list of all the plants growing wild within 100 miles of Brooklyn which could be cultivated, and this served as the basis for work done in the way of bed arrangement and contents. For such plants as are of somewhat indifferent habitat-preference, 34 beds were made, arranged along both sides of the valley, with a grass aisle between. This arrangement has proved very effective and leaves considerable room for the enlargement of the collection later on. Much valuable help was received from Mr. H. A. Caparn, landscape architect, in the arrangement of these beds.

Many of our wild plants will not grow in ordinary garden soil nor in the open sunlight. For these a temporary planting was installed under the shade of the shrub screen along the Flatbush Avenue side of the grounds. A special mixture of leaf mould and rotted sods was prepared, and the result has justified the cultivation of these interesting woodland plants on a larger scale in 1912. Work has already been started on the construction of a winding shady aisle along the top of the border mound, which, when completed, will serve as a congenial home for masses of these native woodland plants, many of them rare and difficult of cultivation. Such plants as Wake-Robin (*Trillium*), Golden-Seal (*Hydrastis*), Cohosh (*Caulophyllum*), May-apple (*Podophyllum*), many of the Lady's-slippers, and scores of others, will thrive only under such conditions as it is planned to create along this shady walk.

Still others of our native plants grow only in bogs, and for these an artificial bog of concrete was constructed. It is of irregular shape, about 43 feet long and from 5-9 feet wide. About 50 species were grown in this during the year, but the bog was not entirely satisfactory, as it leaked during the season, thus leaching out some of the soil acids essential to the proper cultivation of bog plants. At the end of the season it was cleaned out, preparatory to its being made water-tight.

The area along the northern edge of this Section consisted originally of a rough tract, sloping upward to an unsightly embankment. The embankment was pulled down into the valley and a more pleasing slope made. This was done by the firm of

FIG. 10. View of the Central Meadow during the soil improvement operations of 1911, showing the

contractors who made some changes in the paths of the Garden. During the summer I made plans and drew up sketches for the planting of this whole northern border of the Native Wild Flower Garden, and also the replacement of the inner fringe of the Flatbush Avenue border screen, with native shrubs. These plans were first submitted to Mr. Caparn and afterward approved by you.

The scheme involved the planting of strictly native shrubs along both sides of the Native Wild Flower Garden, leaving exotic sorts to serve as a background, and "tie in" the valley. Of native kinds 773 shrubs were planted, the several species of each genus together, to beautify the border of the valley. Fifty-six large shrubs were transplanted from the site of the shaded, border-mound walk mentioned above, and from the site of the building, to fill in the centre of this shrubbery. These will serve as a compact screen and partly create the desired effect until the newly purchased plants become larger. As a general rule, most of the shrubs have been planted with sufficient space between to allow of their normal growth, without the necessity of much subsequent thinning. There are, of course, exceptions to this practice.

Most of our common wild plants cannot be purchased and must be collected in the field. During the season I have collected 126 species, represented by about 280 plants, from within the 100 mile radius, many of them in the grounds. The enlargement of the collection will necessitate a good deal of work of this character, as a comparatively small number of wild plants are offered for sale.

To this Section of the Garden have been added during the season, 2 blanket labels, 53 bed labels and 231 individual plant labels. Many plants were not labeled, as their identity is still a matter of doubt.

Soil Improvement

On the large central meadow of the Garden, comprising 8 1/5 acres, a scheme of soil improvement was carried out, in accordance with an outline submitted by an expert from the Bureau of Soils, U. S. Department of Agriculture, as follows:

PLAN FOR SOIL TREATMENT IN THE CENTRAL MEADOW OF THE BROOKLYN BOTANIC GARDEN

Submitted by

Mr. G. B. MAYNADIER, of the Bureau of Soils, U. S. Dept. Agr.

1911. On old fields or where soil has not recently been hauled in: To July or August permit grass and weeds now occupying the land to make growth—especially if sod is heavy, mowing as often as necessary to prevent development of seed. Mown grass should be permitted to remain on the ground.

July to August plow deeply, turning sod well under, harrow and apply freshly slaked lime at rate of 400 lbs. to 500 lbs. per acre. After plowing apply manure in as large quantities as obtainable. Let lie fallow for two or three weeks. Disc and harrow thoroughly, so as to distribute lime, limestone and manure through the surface soil to a depth of 3 or 4 inches. Sow with rye, using 5 pecks to the acre at least. Time of sowing rye will depend somewhat on the weather, but it must be completed by October, the aim being to get it well started before winter sets in. The rye should be drilled in to get an even stand.

1912. Plow rye under as early in the season as possible, as soon as it has attained a growth of 8 to 10 inches and while it is green and succulent. This plowing should be about 5 inches deep and done in such a manner that the plants are turned well under. Use a plow with *rolling* mold board (not *steep*). Allow this turned-under sod to lie fallow and undisturbed for one to two weeks to allow decomposition of the green parts to set in.

Cross plow and disc to a depth of 3 or 4 inches, applying about 1000 lbs. of ground phosphate rock (Floats) per acre, which must be well harrowed in. Harrow until ground is well pulverized to a depth of 2 or 3 inches. Apply broadcast about 500 lbs. per acre of a fertilizer composed of—

300 lbs. Dried Blood 12½% N.	=37½ lbs. N.
700 lbs. 14% Acid Phosphate	=98 lbs. P.
600 lbs. high grade tankage (9 and 20)	=44.4 lbs. N. 55. 2 P.
400 lbs. Sulph. Potash 90%	=199.6 lbs. K.

This will give in a ton 2000 lbs.=81.9 lbs. N.; 153.2 P.; and 199.6 lbs. K.; or, expressed in usual fertilizer formula—4% N, 7% P, 10% K (4-6-8 *may* be substituted) in an immediately available form, except the N, which, being from organic source, is somewhat slowly available.

It must be borne in mind, however, that considerable phosphoric acid has been added in the ground rock, and some N should be already available as a result of the decomposition of the organic matter and manure, especially if the crimson clover has been used.

Ten per cent. of potash seems rather high, but the soils of this vicinity usually show that potash is one of their chief needs. If a sickly green color is observed in the young growth, it probably results from a

deficiency in N. Top dressing with 150 or 200 lbs. nitrate of soda, after a rain and while the ground is wet, will usually be found a remedy.

After the fertilizer has been well harrowed in, and the land finally leveled, etc., sow to Bluegrass (Kentucky), Red Top and white clover, or to Bluegrass and white clover alone as preferred (I prefer the latter), using two bushels of grass seed and one *peck* of clover per acre. Sow grass seed alone with a broadcast sowing machine and let another man follow sowing the clover lightly and distributing it *evenly*. The difference in size, shape, and weight of the different seeds makes it extremely difficult to mix them in such a manner that an even distribution will result.

If it is considered necessary to use a nurse crop (for which, so far as I am informed, there is no necessity, if grass is started early in the spring), use oats, sowing 3 pecks to the acre with the grass seed. The first cutting should not take place until the grass is about to bloom. If oats are used, cut when the oats are about to show heads. If grass is less vigorous at this time than desired, top dress with nitrate of soda, using 125 to 150 lbs. per acre.

During first season "Keep off the Grass."

Do not mow late in fall. Let grass grow and remain on ground during winter. If necessary to water, use a sprinkling device, not a hose stream, and *soak*, not sprinkle. Get the ground *wet* to at least 4 to 6 inches below the grass roots.

ANNUAL TREATMENT.

In spring remove all rubbish and top dress with 150 lbs. nitrate of soda, 150 lbs. sulph. potash and 250 lbs. acid phosphate, per acre.

In the fall top dress with *well rotted* stable manure, free from weed seed.

As much of the above plan as is called for in 1911 has been carried out very successfully and at a nominal cost, compared with the expense of top-soiling the area. The latter method was estimated to cost, for this area, approximately $50,000. The operations for 1911 (about one-half of the completed scheme) have to date cost as follows:

Expense of Soil Improvement on the Central Meadow for 1911.

Mowing, raking and spreading grass	$114.07
Plowing	48.00
Manure	825.25
Lime	36.00
Spreading manure and lime	105.76
Harrowing	35.28
Rye and clover seed	129.83
Planting rye and clover	9.45
Total	$1,303.64

A plow and disc-harrow, together with some other implements which were purchased for the work, have not been included in this estimate, as the initial expense of such implements is not properly chargeable to this account.

Labels and Labeling

The problem of labeling botanic garden collections presents some difficult educational and practical problems. To supply a label that would embody your suggestions as to what should constitute the subject-matter of general or "blanket" labels, covering in a popular way the plan and scope of the various sections of the Garden, necessitates the making of some sort of card or sheet under a glass frame, or otherwise protected. Some of these labels were put in frames glazed with heavy glass and made water-tight. This has been very satisfactory, but the objection seems to be that the glass is easily broken and then difficult to get out and replace.

Labels printed on celluloid have proved fairly satisfactory, but those printed on cards and then veneered with a thin film of dull-finish celluloid have proved by far the most satisfactory. Your suggestion of the manufacture of these celluloid labels, and also of one printed on oil-cloth, which must be put to a longer test before a definite report can be made on it, indicates the possibility of evolving a large label for botanic gardens that will prove much more satisfactory than the framed and glazed labels hitherto in common use.

The individual plant labels have all been painted on wood, and leave something to be desired as to finish and design. It would be profitable in the long run to have metal labels for all plants of permanent tenure. I have now under consideration a metal label that may perhaps be found useful, but a report on this would be premature at this time. All of the plants in the collection have been supplied with service labels of a suitable design and lasting quality. These are used for our own information, containing the plant accession number, section and bed number, and other convenient data.

A system of accessioning and a card catalog of the collections have been started, and these serve as the basis for the labeling of all of the plants in the Garden. Accession numbers 1-773 have

been used during 1911. Of the plants now in the Garden 2131 have been purchased, 156 derived by gift, 280 collected, and 45 received by exchange.

Assistance

The gardening operations carried on as described above have been done under the immediate supervision of the head gardener and the foreman gardener, by a force of from 7-17 laborers. During 21 weeks 7 men were employed, during 6 weeks in the spring from 9-17 men were employed, and at the opening of the horticultural operations there were from 3-5 men working for two weeks.

Besides the general gardening work mentioned above, this force has attended to the mowing of the lawns, weeding of the paths, general clearing up of the grounds, and other work now scheduled under Section I of your outline of the Departmental Organization of the Garden, and doubtless ultimately should be under the direction of a superintendent of grounds and buildings. During the past year this work has been carried out by the gardening force and I now suggest the segregation of our laborers for 1912 into two divisions, one of gardening proper, to be under the supervision of the head gardener, and another force that shall cover all other general work on the grounds, paths, fences and elsewhere, and be under the supervision of the foreman gardener. It would be desirable, until the appointment of a general superintendent of grounds, that both of these forces report directly to me.

Personal Activities

During time not directly taken up with curatorial duties, I have continued my work on the problem of the distribution of the wild plants hereabouts, involving the publication of the preliminary papers in *Torreya,* and looking to the publication of final results in the near future. I have in addition recorded a number of phenological observations, and am planning a more systematic attempt to keep these as we get better organized later on. In addition I have written articles of a popular nature for the *Garden Magazine.*

I have delivered 8 lectures since my appointment, two of these for The Brooklyn Institute of Arts and Sciences, the others for

other organizations and for the evening lecture course of the Board of Education of New York City. In harmony with the terms of my appointment, some of my time has been spent in editorial work upon the botanical journal *Torreya*. The determination of specimens and answering of inquiries about plants for members of the Department of Botany of the Institute and other citizens of Brooklyn, has also taken some of my time.

Several day-trips for the collection of wild plants have been made to points on Long Island and Staten Island; and in addition I have visited nurseries at Westbury, N. Y., Chestnut Hill (Philadelphia), and Southwick, Mass. To see these commercial establishments has been of great advantage in many ways besides the mere inspection of stock to be purchased.

During August I accompanied you on a three-days' trip to Boston and vicinity, where visits were made to the Arnold Arboretum, the Harvard Botanic Garden, and the Hunnewell Garden, near Wellesley College. This trip was most helpful, and the educational value of these visits amply repays the time and expense of making them.

Recommendations

During the past season the lack of a really adequate water supply has seriously hampered horticultural operations, especially the spraying of plants and lawn sprinkling. The pressure is very weak, and it would be most desirable to have this materially increased by the enlargement of the service main from the street to our grounds. The increase of this pressure will be most essential to the proper care of greenhouse collections, and it is also an important factor in outdoor horticultural operations.

In view of the desirability of increasing the number of wild plants in Section II, I suggest that considerable time next season be given to field work. It would prove advantageous to keep a collector for a month or more in a region that is rich in botanical varieties, in order to make a systematic attempt to get those wild plants not easily detected in shorter or more hurried excursions. This should be done in the summer, or late spring. Many shrubs and large plants marked then could be dug out later in the season, but most of our herbaceous plants could be successfully collected during the summer months.

During the first week in June, 1912, I think it would be profitable for me to spend some time in studying the collections at the Arnold Arboretum, as the results of such a study would be very useful when the plans of the shrub and tree collection are under way. Some time before the completion of the greenhouses it would also be of distinct advantage to the Garden if an opportunity was afforded to study the arrangement, installation and labeling of the plants in the more important public conservatories, especially those of botanic gardens. The artistic, and at the same time scientific arrangement of greenhouse materials, demands a combination of aims and purposes that is not readily attained; and any suggestions from the previous experience of others would be helpful.

In conclusion, I wish to thank you for much kind advice and particularly for the opportunity to carry on my studies in connection with the local flora, begun at the New York Botanical Garden nearly three years ago.

Respectfully submitted,

NORMAN TAYLOR,

Curator of Plants.

REPORT OF THE SECRETARY AND LIBRARIAN FOR 1911

DR. C. STUART GAGER, DIRECTOR.

Sir: I beg to submit herewith my report for the year ending December 31, 1911.

The Library

At the time of my appointment, January 1, 1911, the Botanic Garden did not possess a book to form even the nucleus of a library. During this first year of the Garden's existence, we have been so limited as to space that equipment for receiving, recording and shelving large numbers of books could not be considered, so our acquisitions by purchase have consisted only of such books as were actually required for the conduct of the work of the Garden, and a small number advertised by dealers and which are difficult to procure, or which have been issued in such small editions that they may not be available when we come into possession of our own building, with ample room for caring for a growing library.

In addition to books purchased, we acknowledge the gift of a copy of the first edition of Darwin's "Fertilization of Orchids," from Mr. Alfred T. White; Lindley's "The Vegetable Kingdom," from the late George C. Brackett; nine bound volumes and seventeen unbound volumes of *Science,* five bound volumes of *Gardening,* and a number of unbound miscellaneous publications, from Mrs. Annie Morrill Smith; Report of the Advisory Board of Consulting Engineers for the Improvement of State Canals (New York) for 1910, from Mr. R. C. Murphy; a biography of Carl von Linné (unbound), from Mr. J. V. Borin; twenty-three bound publications from the Geological Survey of New Jersey; six from the U. S. Department of Agriculture; five from the U. S. National Herbarium, two from the U. S. National Museum; one from the Maryland Weather Service; and twenty-three volumes from Dr. C. Stuart Gager, making in all a total of seventy-seven bound volumes presented to the Library.

We have also secured by gift and exchange a large number of pamphlets on botanical subjects. These include reprints and monographs; bulletins and reports from the various divisions of the U. S. Department of Agriculture, and from the State Agri-

cultural Experiment Stations; and from a number of botanical gardens and agricultural departments in foreign countries.

Seed lists have been received from forty-five gardens, as follows:

Aeschach
Amsterdam
Antwerp
Bangalore
Basel
Bombay
Breslau
Brussels
Budapest
Copenhagen
Cracow
Dublin,
  Royal Bot. Gard.
Edinburgh
Erlangen
Frankfurt
Geneva
Genoa
Georgetown
Hamburg
Ibadan
Innsbruck
Kew,
  Royal Botanic
  Gardens
Kolozsvar
Lahore
Lausanne
Lawang
Leipzig
Melbourne
Modena
Montevideo
Montpelier
Nancy
Ootacamund
Paris
Poona
Port Louis
Saïgon
St. Louis, Mo.
  Missouri Botanical
  Garden
St. Petersburg,
  Imperial Gardens,
  Univ. Gardens
Strassburg
Tübingen
Udaipur
Utrecht
Zurich

To secure the publications from the above mentioned botanical gardens and agricultural departments of foreign countries, about three hundred letters were written during the year, arranging for exchange courtesies as soon as the publications of the Brooklyn Garden are ready for distribution.

In accordance with a plan for exchange arranged between yourself and the Director of the New York Botanical Garden, during the first few weeks of my incumbency I spent twelve or fourteen days in the library of that Garden, selecting from their collection of duplicates such publications as would be of value in our library. There are several hundred of these, nearly all pamphlets, with a few bound volumes. Owing to lack of space for handling them, they have been packed in boxes and temporarily stored.

During the past year we have subscribed for four periodicals, viz., Bartonia, Biochemical Bulletin, Landscape Architecture, and the Forestry Journal and Annual Reports of the Canadian Forestry Association, including membership in the Association.

We have had bound twenty-five volumes of the Bulletin of the Torrey Botanical Club, completing the set to 1903.

The following card indexes of Experiment Station literature have been purchased from the U. S. Department of Agriculture:

General Sciences, Air and Water, Soils, Plant Diseases. As we have no cases for containing these, they have not yet been filed.

At the close of the year our library equipment consists of two Library Bureau bookstacks of fourteen shelves, which are entirely inadequate to accommodate the books now belonging to the Garden.

SUMMARY OF PUBLICATIONS RECEIVED DURING 1911.

Books:

	Bound	Unbound
By purchase	154	7
By gift	77	21
By exchange	3	4
Total volumes	234	32

Maps:

By purchase and gift 7

Pamphlets:

By gift and exchange .....Several hundred

Index cards of Experiment Station Literature, U. S. Department of Agriculture:

By purchase ..... 4 sets

Periodicals:

By purchase	4
By exchange	1
By gift	3

The Office

During the year the usual work of an office has been carried on, such as correspondence and filing of letters, typing manuscript, making orders, disbursing petty accounts, paying day laborers, and the keeping of such records of financial transactions as are necessary in the conduct of the office.

Sixteen different blank forms have been devised to facilitate our work, and several card indexes have been inaugurated,

among these being a form for indexing and taking inventory of all equipment and supplies of the office, laboratories and garden, and an index of the botanical gardens of the world, arranged according to countries, and containing 438 names.

In connection with the canvass for votes for names to be placed on the exterior of our Laboratory and Instruction Building, one hundred and fifty circular letters, accompanied by lists of former renowned botanists of the world, have been sent to botanists in our own country, with the request that they express their opinion as to the names most worthy of a place on the building. Circular letters were also sent to forty-eight members of the Department of Botany of The Brooklyn Institute of Arts and Sciences, giving a list of the wild plants needed by the Garden in developing the local flora section. These, with the three hundred circular letters sent to botanical gardens and agricultural departments of the world, bring the number of circular letters mailed to about five hundred. An invitation was also forwarded to the individual members of the Department of Botany of The Brooklyn Institute of Arts and Sciences to join the Torrey Botanical Club trip to Slide Mountain, Ulster County, under the guidance of Mr. Norman Taylor, on June 17-21, 1911.

A system for accessioning plants has been begun and a record of all plants acquired by the Garden during the year has been typed in permanent form on blanks (Form No. 25), specially devised for this purpose. The great desirability of having this record as permanent as possible led to a study of various devices for insuring permanency of record. Coal-tar inks, such as are used for typewriter ribbons, fade out in a few years, while if India ink is used, the record must be made by hand. The final decision has been to make the accession record in duplicate on the typewriter, and retain, as the permanent copy, the carbon duplicate, made in this instance on the best linen-rag paper. These records will probably prove as permanent as any that can be had.

Respectfully submitted,

BERTHA M. EVES,
Secretary and Librarian.

FINANCIAL STATEMENT FOR 1905-1911.

1. CITY MAINTENANCE ACCOUNT FOR 1911 ..... $14,550.00

Salaries:

Appropriated		$10,000.00
Expended		10,000.00
General Supplies:		
Appropriated		4,000.00
Transferred from Fuel		300.00
		4,300.00
Expended		4,297.07
Balance		2.93
Fuel:		
Appropriated		300.00
Expended	0.00	
Transferred to Gen'l Supplies	300.00	300.00
Telephone:		
Appropriated		50.00
Expended		48.70
Balance		1.30
Contingencies:		
Appropriated		200.00
Expended		196.29
Balance		3.71
Summary:		
Total expended		14,542.06
Balance		7.94 14,550.00

2. SPECIAL REVENUE BONDS ACCOUNT (NEW YORK CITY).

Issue authorized March 30, 1911, for necessary preliminary expenses from July 1, 1910, to Feb. 1, 1911	4,744.36
Expended	4,364.86
Balance	379.50

3. Botanic Garden Accounts, 1905-1911.....		5,626.57
The Misses White Endowment Fund ($50,000.00).		
Special Contribution:		
Received 1905-1909	238.35	
Expended (for preliminary expenses, including survey and map of grounds	238.35	
Income Account:		
Income from Investments, 1910.....	1,075.72	
Expended	145.21	
Balance	930.51	
1911.		
Balance from 1910	930.51	
Income from Investments	2,812.50	
	3,743.01	
Expended	1,845.43	
Balance Dec. 31, 1911.....	1,897.58	
Special Contribution:		
Received	1,500.00	
Expended	1,500.00	
Summary:		
Total expended (1905-1911).....	3,728.99	
Balance (Dec. 31, 1911).....	1,897.58	5,626.57

PUBLICATIONS IN THE CITY RECORD OF OFFICIAL ACTION TOUCHING THE ISSUE OF SPECIAL REVENUE BONDS IN 1911 TO THE AMOUNT OF $4,744.36

To cover the preliminary expenses necessary to the establishment of the Botanic Garden and Arboretum on Park Lands in the Borough of Brooklyn.

1911.

Jan. 3. **The Commissioner of Parks** (39:47. 5 Ja 1911) *applies* to the Board of Aldermen for the issuance of Special Revenue Bonds to the amount of $4,744.36. Referred to the Finance Committee.

Jan. 17. **The Finance Committee of the Board of Aldermen** (**39**:458. 19 Ja 1911) *recommends* to the Board of Aldermen the issuance of Special Revenue Bonds to the amount of $4,744.36. *Laid over.*

Jan. 24. **The Finance Committee of the Board of Aldermen** (**39**:665. 26 Ja 1911) *recommends* to the Board of Aldermen that the Board of Estimate and Apportionment be requested to authorize the Comptroller to issue Special Revenue Bonds to the amount of $4,744.36. *Decided in the negative.* On motion the vote was *reconsidered,* and the paper restored to its place on the list of General Orders.

Feb. 28. **The Finance Committee of the Board of Aldermen** (**39**:1713. 2 Mr 1911) *recommends* to the Board of Aldermen that the Board of Estimate and Apportionment be requested to authorize the Comptroller to issue Special Revenue Bonds to the amount of $4,744.36. *Accepted.*

Mar. 10. **The Mayor** (**39**:2087. 11 Mr 1911) *approves* the the resolution that the Board of Estimate and Apportionment be requested to authorize the Comptroller to issue Special Revenue Bonds to the amount of $4,744.36.

Mar. 30. **The Board of Estimate and Apportionment** (**39**:2971. 6 Ap 1191) *approves* the above resolution, and *authorizes* the Comptroller to issue special revenue bonds to the amount of $4,744.36.

The Brooklyn Institute of Arts and Sciences

PROF. FRANKLIN W. HOOPER, *Director*.

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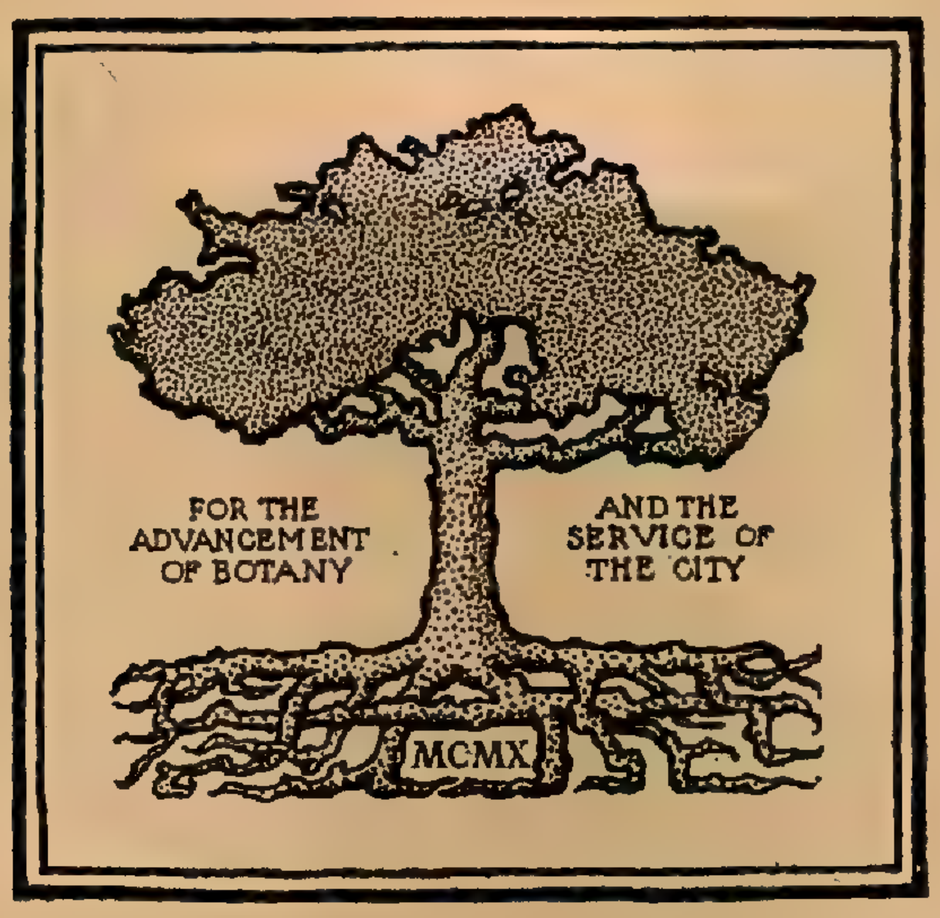
BROOKLYN BOTANIC GARDEN

RECORD

VOL. I JULY, 1912 No. 3

EDITED BY

C. STUART GAGER



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PUBLISHED QUARTERLY FOR THE GARDEN
BROOKLYN, N. Y.

Botanic Garden Staff

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MR. NORMAN TAYLOR, *Curator of Plants*

Dr. WILLIAM MANSFIELD,
Honorary Curator of Economic Botany

MISS BERTHA M. EVES, *Secretary and Librarian*

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OLMSTED BROS., *Landscape Architects*

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

Vol. I Brooklyn, N. Y., July, 1912 No. 3

PHIPPS HALL OF BOTANY, PITTSBURGH

The city of Pittsburgh affords an illustration of a unique experiment in secondary education. Several years ago Mr. Henry Phipps presented to the city a range of plant houses, located in Shenley Park. These houses were well stocked, and the opportunity thus offered for plant study was soon taken advantage of by teachers in the local high schools. Under the supervision of Mr. Edward Rynearson, now Director of High Schools, with the co-operation of Miss Jennie Gosser, Miss Anna M. Deens, Dr. David R. Sumstine, and other teachers, classes in botany were taken to the conservatories for demonstrations. This was part of a larger and admirable scheme of out-of-doors excursions in connection with all the natural science classes.

These trips to the conservatory quite naturally proved to be both profitable and popular to pupils and teachers alike. But the interior plan of the plant houses made it awkward for the teacher to address the class and assemble it to advantage for demonstrations, for standing room was afforded only by the long, winding walks, and this made it impossible for more than a minority to stand sufficiently near the teacher. Moreover, there was no opportunity for seating the classes. This situation, and the extent to which the conservatories were being thus used,

were finally brought to the attention of Mr. Phipps. He at once manifested much interest in the work, and invited the teachers of botany to a conference with him. At this conference the teachers pointed out the advantage of having a room for assembling pupils for class exercises, and indicated the possibility of doing more and better work if such a room could be secured.

The response of Mr. Phipps was prompt and generous. He offered to put up a building at a cost of not to exceed $20,000. The teachers co-operated with the architect in planning the building, and though the estimated expense as planned was $25,000, the construction was authorized. Before the structure was completed it had cost about $29,000, all of which was met by Mr. Phipps.

The building, which is of brick, with one story and basement, was completed in 1901. On the main floor are an entrance hall, with a reception room to the right, and a large, well-lighted class room and laboratory combined, with raised seats, and laboratory tables and chairs at the higher level near the windows. In the basement is a second, smaller but spacious, laboratory. The building closely adjoins the plant houses, and these supply an abundance of material for study, not only to the Phipps Hall, but to the three high school buildings, located in different parts of the city. The greenhouses, in charge of a head gardener, Mr. John Jones, are administered entirely at city expense. The head gardener is in sympathy with the high school work, and when any class material is needed the teachers notify him when it is wanted, and it is prepared, ready to be sent for by the school on the given date. Not only are the regular collections drawn on for this purpose, but germinated seeds are prepared, and seedlings reared to any desired stage of development.

The class work at the Hall of Botany has assumed such proportions as to necessitate the constant attendance there of one of the regular high school teachers of botany. This teacher hears daily four classes of 35 each. In addition to this, on three days of the week, different teachers, from the various high school buildings, meet their classes at the hall, two classes of 35 each, so that on two days the class attendance is 140 and on three days 210.

Those who are in touch with the administration of municipal high schools will be impressed at once by two rather unusual features in this plan: First, that it is looked upon at all favorably by the local board of education; second, that the school administration finds it not only entirely feasible, but satisfactory and profitable, to allow these classes double periods for their laboratory work. This is worthy of note, because both these features have been time and again pronounced entirely impractical and unwise by school authorities, and especially by the makers of the programs of daily recitations. Probably the hardest fight that the various sciences have had since their struggle to secure any recognition at all in the high school curriculum has been the contest to secure double periods for laboratory or field work. It has been held in many quarters to be not only undesirable, but quite impossible without entirely upsetting the daily program of classes. However, as the Pittsburgh plan clearly demonstrates, when all concerned are in sympathy with such a plan it proves to be both practicable and desirable; it can no longer be considered problematical and debatable. The co-operation of the Pittsburgh board of education in this plan is locally attributed chiefly to the efforts of Mr. William Falconer, who is greatly interested in the teaching of botany, and also to the breadth of view of the individual members of the board.

One of the classes goes directly to the Hall of Botany in the morning at 8:45, and thence, at the close of the double period, to the high school building. Another class leaves the high school in time to spend the last two periods of the day at the Hall, from which they return to their homes. The other classes go from the school and return to it during the hours of session. Experience has shown the maximum time required to pass from the Hall of Botany to the various school buildings, and the pupils are held strictly to keeping within this time. If, as is the case with some of the schools, it is necessary to ride, the pupil pays his own carfare. Classes seldom go in a body, and seldom under the immediate charge of the teacher.

Of course, there has been some opposition to this plan. Good things always find some opponents. Now and then a disgruntled parent, or one with restricted outlook, objects to paying car-

fare, or regards the entire scheme as one of the modern "frills," wasting time which could be spent on something more "practical." But the opposition has been sporadic, the pupils themselves are, for the most part, quite enthusiastic, and other cities may well envy Pittsburgh the possession of this unique opportunity and the great success with which it has been utilized.

The aim of the Brooklyn Botanic Garden to further as much as possible the botanical work in local schools, both public and private, renders the Pittsburgh plan especially interesting and significant to the Garden administration, demonstrating, as it does, the entire feasibility of cooperation between the Garden and the local schools. All that is necessary to success is a recognition of the mutual advantages to be thus derived, and cooperation in devising and carrying out a suitable plan.

C. Stuart Gager.

CONFERENCE ON OUTSIDE COOPERATION WITH PUBLIC SCHOOLS

In response to invitations sent by Mr. John Purroy Mitchel, President of the Board of Aldermen of New York City and Chairman of the Board's Committee on School Inquiry, a conference was held on Friday afternoon, May 17, 1912, at 3:30 o'clock, in the gymnasium of the Colony Club, Madison Avenue and Thirtieth Street. Forty questions were proposed for discussion, under the following three heads: 1. How much more cooperation is available for schools? 2. How may agencies secure adequate discussion of school estimates for the budget of 1913? 3. Is there need for a central coordinating outside agency?

Representatives were invited from all outside organizations that deal directly with children of school age, including libraries, correctional institutions, truant agencies, dispensaries and hospitals, children's courts, parent-teacher associations, vacation schools, school-gardens, playgrounds, settlement houses, and the Public Education Association. The Brooklyn Institute was represented by the Director, Prof. Franklin W. Hooper, and by the Director of the Botanic Garden.

Among the questions that more immediately affect such institutions as our own and other botanical gardens, the zoological park, and the various city museums, were the following:

1. How can the maximum cooperation be developed in using zoological parks for educational purposes?

2. Is it practicable for high school teachers with their classes to use the laboratories and grounds of botanical gardens for regular class exercises?

3. What helpfulness is available in scientific bodies and universities?

4. Should adequate and inexpensive transportation of school children to museums and zoological parks be provided?

5. Should the city support school gardens?

6. How should nature material demanded by the course of study be supplied?

7. Will the service of the Public Education Association as a central clearing house for outside cooperation with public schools be welcomed by public and private agencies and by school officials?

The discussion was opened by President Egerton L. Winthrop, Jr., of the Board of Education, who urged the desirability of effecting a closer and better regulated cooperation between the educational interests of the city. Although the subsequent speakers were, for the most part, limited to five minutes each, there was not sufficient time to permit of the discussion of all the questions proposed .

Of the seven questions indicated above only the fourth and seventh were discussed. Mr. George H. Sherwood, Curator of the Department of Public Education of the American Museum of Natural History, was asked to speak on the fourth question. He referred to the very large number of school children visiting that museum in classes with their teachers, but stated that this attendance had considerably and very noticeably diminished since the street railway company had done away with the former system of transfers. Mr. Sherwood raised the question of the possibility of making some arrangement whereby special tickets at reduced fare might be issued to school children, to be used between certain hours of the day for trips to and from the museum.

Concerning the seventh question above, it seemed to be the prevailing sentiment of the conference that the Public Education Association could to advantage serve as a central clearing house for outside cooperation between public schools and private or semi-private agencies. It was voted that the chairman, Mr. Mitchel, appoint a committee of nine from various outside organizations to consider, in consultation with the proper representatives of the city, the questions of cooperation, and that a committee of three be appointed to make recommendations for membership on the committee of nine.

The calling of this conference was a most admirable conception, and ought certainly to result in more efficient cooperation between the public schools and the other organizations concerned. We give elsewhere in this issue, under the title "Phipps Hall of Botany, Pittsburgh," a suggestion of how the Brooklyn Botanic Garden and local schools may become mutually helpful in the work of botanical instruction. C. S. G.

EFFECT OF THE PAST WINTER ON SHRUBS AND TREES IN THE GARDEN

The Garden has been fortunate in not having suffered heavily from the effects of the severe winter just passed. From all over the eastern states reports are current of heavy losses of nursery stock and trees.

The winter presents some interesting climatological data, some of which help to explain the loss of so many plants. December was the warmest it has been for 21 years, while January and the first part of February were colder than any similar season since 1893, or perhaps since 1875. This rigorous cold, following a particularly mild December, was undoubtedly a factor in the destruction of thousands of plants.

In Brooklyn and in the climatically similar region along the coast of New Jersey the normal period between the first autumn frost and the last spring frost is 176 days. During the past winter the period between these frosts was 159 days. In other words, while extremely low temperatures were common during

January and early February, and the mean temperature for the whole winter has been from 3°-6° lower than the normal, the length of the winter season was about 17 days less than usual. After the winter "broke up," about the middle of February, there were several cold periods interspersed with destructive thaws and high winds.

Of the fourteen hundred shrubs planted in the Garden during October and November, 1911, less than thirty have died outright. Curiously enough, two of these were the perfectly hardy and native arborvitae, and one the American yew (*Taxus canadensis*). Several hundred of the shrubs were killed back, some for half their length from the tip, others down to the crown. Of our native plants the sweet pepper-bush (*Clethra alnifolia*), Virginia willow (*Itea virginica*), sheep laurel (*Kalmia angustifolia*), were all killed back practically to the snow line, which this winter was very low.

Of the twenty plants of *Vitex Agnus-castus* all are killed back practically to the ground, but all seem to be alive and sending out shoots from the base. The silvery leaves of *Salix regalis* are also coming out only below the snow line. Most plants of the rose and hydrangea families are all in good condition, such as *Philadelphus, Spiræa, Rhodotypus, Deutzia,* and many others.

Plants that were put in with some misgiving, such as *Ilex crenata* and *Abelia chinensis,* are coming through very well, the former only getting a temporary setback and the latter being in excellent condition.

In the spring of 1911 seventeen small seedlings and two young saplings of the giant redwood (*Sequoia Washingtoniana*) were set out in the nursery. These trees all did well, and on the approach of winter one of the saplings was transferred to a cold frame, and half of the seedlings were entirely covered with a banking of leaves. In early April, 1912, the unprotected trees were to all appearances dead, but to our surprise, though the foliage of 1911 was entirely winter killed, are all putting forth an abundance of new shoots from last season's buds and give every promise of becoming established.

It seems very probable that these and other evergreen trees suffered last winter not so much from cold as from a condition

of drought during the early spring. This resulted from the fact that the loss of water from the leaves by transpiration became active before the ground around the roots was thawed out. Thus the loss of water was more rapid than the supply, which, in effect, is drought. It is desirable, however, to test this suggestion by further observations and experiment.

The results of this season make it seem likely that we shall ultimately be able to grow many species of shrubs and trees not hardy even a few miles northward. The ameliorating effect of the blanket created by the city's smoke and our proximity to the sea and to Long Island Sound makes the climate in the region of the Garden a very favorable one for the cultivation of plants that are on the dividing line of hardiness or tenderness.

NORMAN TAYLOR.

FIG. 11. A portion of the Division of External Anatomy of the Morphological Section, showing the blanket label. Aug. 14, 1911.

LAWS OF NEW YORK STATE CONCERNING THE BROOKLYN BOTANIC GARDEN

LAWS OF NEW YORK, 1897. CHAP. 509.

AN ACT to provide for the establishment of a botanic garden and arboretum on park lands in the city of Brooklyn, and for the care of the same.

Became a law May 18, 1897, with the approval of the Governor. Passed, three-fifths being present. Accepted by the city.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Lands to be set apart.

SECTION 1. The park commissioner of the city of Brooklyn is hereby authorized and required to set apart and appropriate all of that portion of Prospect park bounded northerly by the Eastern parkway, easterly by Washington avenue, southerly by the line formerly dividing the city of Brooklyn from the late town of Flatbush, and westerly by Flatbush avenue, excepting only such lands as have been reserved for the Prospect hill reservoir, as have been leased to the Brooklyn Institute of Arts and Sciences, and as have been set apart and designated by the mayor and park commissioner of the city of Brooklyn as a site for the Brooklyn Public library, for the establishing and maintaining thereon of a botanic garden and arboretum

Objects of the Garden.

for the collection and culture of plants, flowers, shrubs and trees, the advancement of botanical science and knowledge, and the prosecution of original researches therein and in kindred subjects; for affording instruction in the same, and for the prosecution and exhibition of ornamental and decorative horticulture and gardening, and for the entertainment, recreation and instruction of the people, and the said lands so set apart and appropriated shall be used for no other purposes than those authorized by this act.

Laying out of the Garden.

§ 2. The said park commissioner or his successor or successors is hereby authorized and directed to cause said lands, bounded and described in section one of this act, to

be laid out as a botanic garden and arboretum, and as a proper approach to the Museum building of the Brooklyn Institute of Arts and Sciences, by a competent landscape gardener, and on plans approved by the said park commissioner or his successor or successors, and said proper approach to the Museum building shall be subject to the approval of the board of trustees of said institute. And means for the proper construction, planting, equipment, and maintenance of said garden and arboretum shall be provided in the same manner as for the support and maintenance of other park lands in the city of Brooklyn or its successor.

Approach to Museum building.

Means, how provided.

§ 3. All acts or parts of acts inconsistent with this act are hereby repealed.

Repeal.

§ 4. This act shall take effect immediately.

Laws of New York, 1906. Chapter 618.

AN ACT to amend chapter five hundred and nine of the laws of eighteen hundred and ninety-seven, entitled "An act to provide for the establishment of a botanic garden and arboretum on park lands in the city of Brooklyn and for the care of the same."

Became a law, May 24, 1906, with the approval of the Governor. Passed, three-fifths being present.

Accepted by the city.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

Section 1. Chapter five hundred and nine of the laws of eighteen hundred and ninety-seven, entitled "An act to provide for the establishment of a botanic garden and arboretum on park lands in the city of Brooklyn and for the care of the same," is hereby amended so as to read as follows:

L. 1897, ch. 509, amended.

§ 1. The park commissioner of the city of Brooklyn is hereby authorized and required to set apart and appropriate all of that portion of Prospect park bounded northerly by the Eastern parkway, easterly by Washington avenue, southerly by the line formerly dividing the city of Brooklyn

Site for botanic garden and arboretum.

from the late town of Flatbush, and westerly by Flatbush avenue, excepting only such lands as have been reserved for the Prospect hill reservoir, as have been leased to the Brooklyn institute of arts and sciences, and as have been set apart and designated by the mayor and park commissioner of the city of Brooklyn as a site for the Brooklyn public library, for the establishing and maintaining thereon of a botanic garden and arboretum for the collection and culture of plants, flowers, shrubs and trees, the advancement of botanical science and knowledge, and the prosecution of original researches therein and in kindred subjects; for affording instruction in the same, and for the prosecution and exhibition of ornamental and decorative horticulture and gardening, and for the entertainment, recreation and instruction of the people, and the said lands so set apart and appropriated shall be used for no other purposes than those authorized by this act.

Objects of the Garden.

Agreement with Brooklyn Institute of Arts and Sciences; conditions.

§ 2. Whenever the Brooklyn institute of arts and sciences, incorporated by chapter one hundred and seventy-two of the laws of eighteen hundred and ninety, shall have raised or secured by private subscription the sum of fifty thousand dollars within one year from the passage of this act, the principal of which or the income thereof to be set apart and used by the said institute for the purchase of plants, flowers, shrubs and trees, to be set out in said botanic garden or arboretum, the board of estimate and apportionment of the city of New York, on the recommendation of the board of commissioners of public parks of said city of New York is hereby authorized in its discretion to enter into an agreement† on behalf of said city with the said Brooklyn institute of arts and science* for the establishing and maintaining by said institute of a botanic garden and arboretum upon such terms and conditions as may be agreed to, on any or all the lands mentioned in section one of this act, excepting thereout the lands designated as a site for a public library by chapter five hundred

Lands excepted from site designated.

† See *Bot. Gard. Record* 1 : 7-16. Ja. 1912.
*So in original.

and fifty-three of the laws of nineteen hundred and five, and on any of the lands lying between Washington avenue and Flatbush avenue acquired by the city of New York and bounded northerly by the line formerly dividing the old city of Brooklyn from the late town of Flatbush, easterly by Washington avenue and southerly and westerly by Flatbush avenue. The plans for the said botanic garden and arboretum shall be subject to the approval of the said board of park commissioners. And said board of commissioners is thereupon hereby authorized to construct and equip, upon the lands designated in said agreement and according to plans to be approved by them and by the trustees of said institute, suitable planthouses for the care and culture of tender or other plants, indigenous or exotic, and rooms for instruction in botany, the use of same upon completion to be transferred to the said Brooklyn institute of arts and sciences for the purposes stated in this act; and for the purpose of providing means therefor it shall be the duty of the comptroller of the city of New York, upon being thereto requested by the said commissioners, and upon being authorized thereto by the board of estimate and apportionment and the board of aldermen of said city, to issue and sell corporate stock of the city of New York in the manner now provided by law aggregating the sum of one hundred thousand dollars.

Plans.

Construction of buildings authorized.

Issue of corporate stock of city authorized.

§ 3. No intoxicating liquors shall be sold or allowed on the grounds set apart as above provided. For police purposes and for the maintenance of proper roads and walks, the said grounds shall remain subject at all times to the control of said board of commissioners of the department of parks; but otherwise, after the completion of said planthouses and rooms, and the construction of proper roads and walks therein by the department of parks, the said grounds and buildings shall be under the management and control of said Brooklyn institute of arts and sciences. Said grounds shall be open and free to the public daily, including Sundays, subject to such restrictions only as to hours as the proper care, culture and preservation of the

Intoxicating liquors not to be sold.

Management and control.

Grounds to be open free, when and to whom.

said garden may require; and its educational and scientific privileges shall be open to all alike, male and female, upon such necessary regulations, terms and conditions as shall be prescribed by the board of trustees of said institute and approved by said board of commissioners of the department of parks.

Annual appropriation for maintenance.

§ 4. The board of estimate and apportionment and the board of aldermen of the city of New York on the making of an agreement as provided in section two of this act, are hereby authorized on the recommendation of the said board of park commissioners, in their discretion, to appropriate annually a sum or sums of money, for the care and maintenance by said institute of said botanic garden and arboretum and of the planthouses and rooms for instruction erected thereon.

§ 5. This act shall take effect immediately.

LAWS OF NEW YORK, 1911. CHAP. 178.

AN ACT to amend chapter five hundred and nine of the laws of eighteen hundred and ninety-seven, entitled "An act to provide for the establishment of a botanic garden and arboretum on park lands in the city of Brooklyn and for the care of the same," generally.

Accepted by the City.

Became a law May 20, 1911, with the approval of the Governor. Passed by a two-thirds vote.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

L. 1897, ch. 509, as amended by L. 1906, ch. 618, amended.

SECTION 1. Chapter five hundred and nine of the laws of eighteen hundred and ninety-seven, entitled "An act to provide for the establishment of a botanic garden and arboretum on park lands in the city of Brooklyn and for the care of the same," as amended by chapter six hundred and eighteen of the laws of nineteen hundred and six, is hereby amended so as to read as follows:

Site for botanic garden and arboretum.

§ 1. The park commissioner of the city of New York, having jurisdiction of the boroughs of Brooklyn and

Queens[1] is hereby authorized and required to set apart and appropriate all that portion of Prospect Park bounded northerly by the Eastern parkway, easterly by Washington avenue, southerly by the line formerly dividing the city of Brooklyn from the late town of Flatbush, and westerly by Flatbush avenue, excepting only such lands as have been reserved for the Prospect Hill reservoir, as have been leased to the Brooklyn Institute of Arts and Sciences,[2] for the establishing and maintaining thereon of a botanic garden and arboretum for the collection and culture of plants, flowers, shrubs and trees, the advancement of botanical science and knowledge, and the prosecution of original researches therein and in kindred subjects; for affording instruction in the same, and for the prosecution and exhibition of ornamental and decorative horticulture and gardening, and for the entertainment, recreation and instruction of the people.[3]

Objects of the Garden.

§ 2. Whenever the Brooklyn Institute of Arts and Sciences, incorporated by chapter one hundred and seventy-two of the laws of eighteen hundred and ninety, shall have raised or secured by private subscription the sum of fifty thousand dollars within one year from the passage of this act, the principal of which or the income thereof to be set apart and used by the said institute for the purchase of plants, flowers, shrubs and trees,[4] or for other purposes in connection with said botanic garden and[5] arboretum, the board of estimate and apportionment of the city of New York on the recommendation of the board of commissioners of public parks of the said city of New York is hereby authorized in its discretion to enter into an agreement on behalf of said city with the said Brooklyn Institute of Arts

Agreement with Brooklyn Institute of Arts and Sciences; conditions.

---

1. Section to here formerly read: "The park commissioner of the city of Brooklyn."

2. Words "and as have been set apart and designated by the mayor and park commissioner of the city of Brooklyn as a site for the Brooklyn public library," omitted.

3. Words "and the said lands so set apart and appropriated shall be used for no other purposes than those authorized by this act," omitted.

4. Words "to be set out in," omitted.

5. Formerly "or."

and Sciences for the establishing and maintaining by said institute of a botanic garden and arboretum upon such terms and conditions as may be agreed to, on any or all the lands mentioned in section one of this act, excepting

Lands excepted from site designated.

thereout the lands designated as a site for a public library by chapter five hundred and fifty-three of the laws of nineteen hundred and five, and also excepting therefrom such lands as have been designated and set apart by the board of park commissioners and the board of estimate and apportionment of the said city of New York as a site for an astronomical observatory in pursuance of chapter six hundred and thirty-seven of the laws of nineteen hundred and six;[6] and on any of the lands lying between Washington avenue and Flatbush avenue acquired or that may hereafter be acquired[7] by the city of New York and bounded northerly by the line formerly dividing the old city of Brooklyn from the late town of Flatbush, easterly by Washington avenue and southerly and westerly by Flatbush avenue. The plans for the said botanic garden and arbore-

Plans.

tum shall be subject to the approval of the said board of park commissioners. And said board of commissioners is thereupon hereby authorized to construct and equip, upon the lands designated in said agreement and according to plans to be approved by them and by the trustees of said institute, suitable planthouses for the care and culture of tender or other plants, indigenous or exotic, and rooms for instruction in botany, the use of same upon completion to be transferred to said Brooklyn Institute of Arts and Sciences for the purposes stated in this act, and for the purpose of providing means therefor, and of providing means for grading, soil additions, and other permanent improvements in said garden and arboretum[8] it shall be the duty of the comptroller of the city of New York, upon being thereto requested by the said commissioners, and

Construction of buildings authorized.

Issue of corporate stock of city for permanent improvements authorized.

---

6. Words "and also excepting therefrom * * * and six," new.
7. Words "or that may hereafter be acquired," new.
8. Words "and of providing means * * * and arboretum," new.

upon being authorized thereto by the board of estimate and apportionment and the board of aldermen of said city, to issue and sell corporate stock of the city of New York in the manner now provided by law.[9]

Issue of corporate stock of city authorized.

§ 3[10]. And the board of estimate and apportionment of the city of New York, on the recommendation of the board of park commissioners of said city of New York, is hereby authorized in its discretion from time to time to amend the agreement already authorized by chapter six hundred and eighteen of the laws of nineteen hundred and six or to enter into a supplementary agreement or supplementary agreements altering the boundaries of the said botanic garden and arboretum so as to include any portion of the lands now or hereafter reserved for the Prospect Hill reservoir which may be from time to time designated by the commissioner of water supply, gas and electricity, or his successor or successors, as no longer needed for reservoir purposes; and the board of estimate and apportionment of the city of New York is further authorized in its discretion to alter the boundary line between the lands leased by the city of New York to the Brooklyn Institute of Arts and Sciences as a site for a museum of arts and sciences and libraries and lands now leased or that may hereafter be leased by said city to said institute for the purposes of a botanic garden and arboretum as may be agreed to between the said board of estimate and apportionment and the said Brooklyn Institute of Arts and Sciences.

Alteration of boundaries of site authorized.

§ 4[11]. No intoxicating liquors shall be sold or allowed on the grounds set apart as above provided. For police purposes and for the maintenance of proper roads and walks, the said grounds shall remain subject at all times to the control of said board of commissioners of the department of parks; but otherwise, after the completion of said planthouses and rooms, and the construction of proper roads and walks therein by the department of parks, the

Intoxicating liquors not to be sold.

Management and control.

9. Words "aggregating the sum of one hundred thousand dollars," omitted.

10. Section 3 new.

11. Formerly § 3.

said grounds and buildings shall be under the management and control of said Brooklyn Institute of Arts and Sciences.

Grounds shall be open free, when and to whom.

Said grounds shall be open and free to the public daily, including Sundays, subject to such restrictions only as to hours as the proper care, culture and preservation of the said garden may require; and its educational and scientific privileges shall be open to all alike, male and female, upon such necessary regulations, terms and conditions as shall be prescribed by the board of trustees of said institute and approved by said board of commissioners of the department of parks.

Annual appropriation for maintenance.

§ 5[12]. The board of estimate and apportionment and the board of aldermen of the city of New York on the making of an agreement as provided in paragraph two of this act, are hereby authorized on the recommendation of the said board of park commissioners, in their discretion, to appropriate annually a sum or sums of money for the care and maintenance by said institute of said botanic garden and arboretum and of the planthouses and rooms for instruction erected thereon.

§ 2[13]. This act shall take effect immediately.

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12. Formerly § 4.
13. So in the original.

NOTES

On May 1 Dr. William Mansfield was appointed honorary curator of economic plants, with special reference to medicinal and poisonous plants. Dr. Mansfield is professor of pharmacognosy in the college of pharmacy of Columbia University, and is specially interested in the breeding of medicinal plants. Cultures of many different species of these plants have been started in the Garden. It is an interesting fact that, while most of our food, condiment, and fiber plants are cultivated, medicinal plants, with very few exceptions, such as poppy and ginseng, have never been grown as a crop, the supply being entirely dependent upon wild plants.

Dr. Edgar W. Olive, professor of botany in South Dakota State College, and state botanist, has been appointed Curator of Public Instruction in the Garden, beginning September 1.

On February 24 Mr. Norman Taylor opened the spring course of museum lectures at the Central Museum with a lecture on "Our poisonous plants: their haunts and habits, their poisons and antidotes." The last lecture of the course was by Dr. Gager on "The plants and people of western Cuba."

Dr. Roland M. Harper, of the State Geological Survey of Alabama, called at the Garden on April 10. Other callers have been Mel T. Cook, of Rutgers College, on April 13, and Miss Emmeline Moore, on May 15. Miss Moore was formerly a member of the faculty of the New Jersey State Normal School, at Trenton, but resigned about eighteen months ago to accept an appointment of one year as acting professor of botany in the Huguenot College, Wellington, Cape Colony, South Africa, during the absence of the regular professor.

By invitation of the Natural History Club of Erasmus Hall high school, Dr. Gager addressed the club on May 13 on "The plant life of Cuba." The club is a student organization of those interested in botany or zoology; teachers in the department of biology are honorary members. Regular meetings are held

twice a month during the school year with a program consisting of reports and discussion by the members, or of a lecture or talk by some invited guest. Numerous field trips are also taken to the city museums, parks, and botanical gardens, and also into the neighboring country. Similar organizations exist in the other city high schools which have a department of biology. The membership in these organizations indicates a very gratifying interest in biological studies among the high school pupils of New York City, and also reflects much credit on the inspiration given by the instructors in biology.

Work on the first sections of the Laboratory and Instruction building and the conservatories is progressing rapidly. The excavation is completed, and the foundations are well along. The contract calls for the completion of these sections in 150 working days. Work commenced on April 8.

At the centennial celebration of the Philadelphia Academy of Sciences, on March 19-21, the Director of the Garden was a delegate representing the Torrey Botanical Club and the University of Missouri.

In 1911 the Arnold Arboretum, of Harvard University, began the weekly publication of a *Bulletin of Popular Information* concerning the trees and shrubs growing in the Arboretum. The numbers average about four pages each. Bulletin 21, for May 9, 1912, calls attention to the wild pear trees, some of the willows, the currants and gooseberries, honeysuckles, barberries, hobble bush, hickories, and other shrubs just coming into leaf or flower at that date. Bulletin 22 is devoted chiefly to apple trees, with notes on some of the hawthorns, *Rhododendron (Azalea) Kaempferi,* and *Viburnum Carlesii.* Bulletin 23 contains interesting information concerning the lilacs, species of hawthorn *(Crataegus),* the Ohio buckeye *(Aeschylus glabra),* American magnolia, elders *(Sambucus), Fothergilla,* and *Lonicera.* The Bulletins call attention to the activity of the plants at the given date, and include interesting information concerning their origin and history, geographical distribution, their value in horticulture and

landscape architecture, their systematic affinities, and other items of botanical interest.

The Garden takes pleasure in acknowledging the gift, on May 3, 1912, from Mr. Henry Hicks, of Isaac Hicks & Son, of eight different species of Magnolia, and seven different species of evergreens; also from Mr. John McCallum of two living specimens of the rare globe-flower (*Trollius laxus*), six plants of the same species from Miss E. M. Kittredge, and several plants of the pixy or "flowering moss" (*Pyxidanthera barbulata*), from Burrsville, Ocean Co., New Jersey, given by Miss Marie W. du Puget.

On May 9 Dr. Gager was in Pittsburgh inspecting the organization and equipment of the Phipps Hall of Botany, and on May 12 Mr. Taylor was in Brookline, Mass., and vicinity, in company with Mr. Frederick Law Olmsted, to make a study of the features of small streams in connection with the construction of the artificial brook through the Garden. Water was turned into the brook for the first time on May 27.

The Brooklyn Institute of Arts and Sciences

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PUBLICATIONS

OF THE

BROOKLYN BOTANIC GARDEN

RECORD. Established January, 1912. An administrative periodical, issued quarterly. Contains, among other things, the annual report of the Director and heads of the departments, special reports, announcements of courses of instruction, miscellaneous papers, and notes concerning Garden progress and events.

CONTRIBUTIONS. Papers originally published in botanical or other periodicals, reissued as "separates," without change of paging, and numbered consecutively. This series includes occasional papers, as well as those embodying the results of research done at the Garden, or by members of its staff or students. Twenty-five numbers constitute one volume. Price 25 cents each, $5.00 a volume.

1. *The Educational Work of Botanic Gardens.* 13 pages.

2. *The Purpose of an Introductory Course in Botany.* 8 pages.

3. *Cryptomeric Inheritance in Onagra.* 11 pages, figs. 2; plates 2.

GUIDES to the collections, buildings, and grounds. Price based upon cost of publication.

1. *The Brooklyn Botanic Garden.* Price, 5 cents.

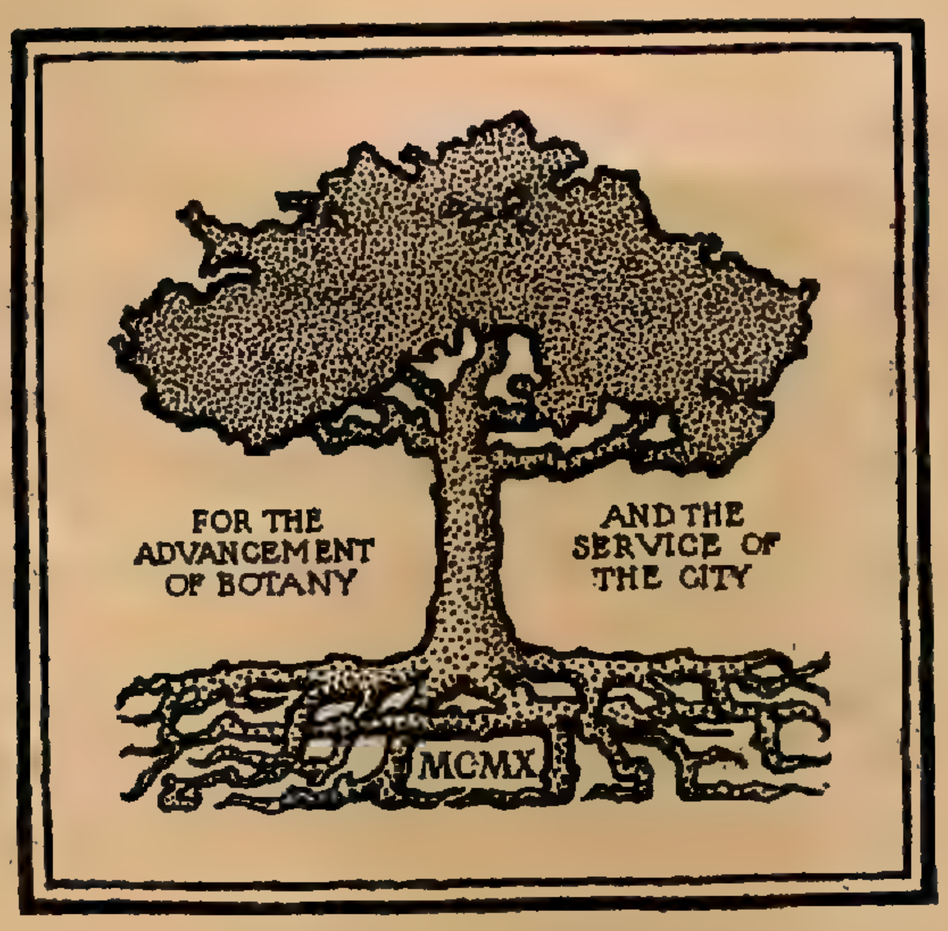
BROOKLYN BOTANIC GARDEN

RECORD

VOL. I OCTOBER, 1912 No. 4

EDITED BY

C. STUART GAGER



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PUBLISHED QUARTERLY FOR THE GARDEN
BROOKLYN, N. Y.

Botanic Garden Staff

DR. C. STUART GAGER, *Director*

MR. NORMAN TAYLOR, *Curator of Plants*

Dr. EDGAR W. OLIVE, *Curator of Public Instruction*

Dr. WILLIAM MANSFIELD,
Honorary Curator of Economic Plants

MISS BERTHA M. EVES, *Secretary and Librarian*

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McKIM, MEAD & WHITE, *Architects*

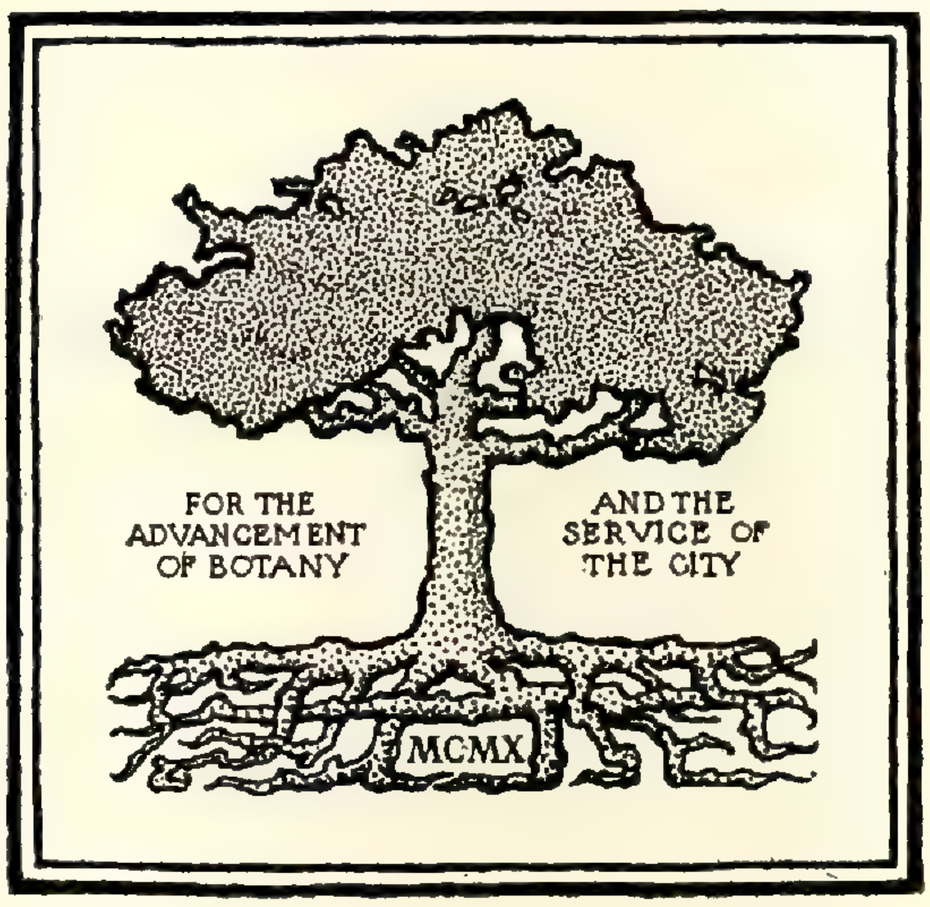
OLMSTED BROS., *Landscape Architects*

BROOKLYN BOTANIC GARDEN

RECORD

EDITED BY

C. STUART GAGER



VOLUME I

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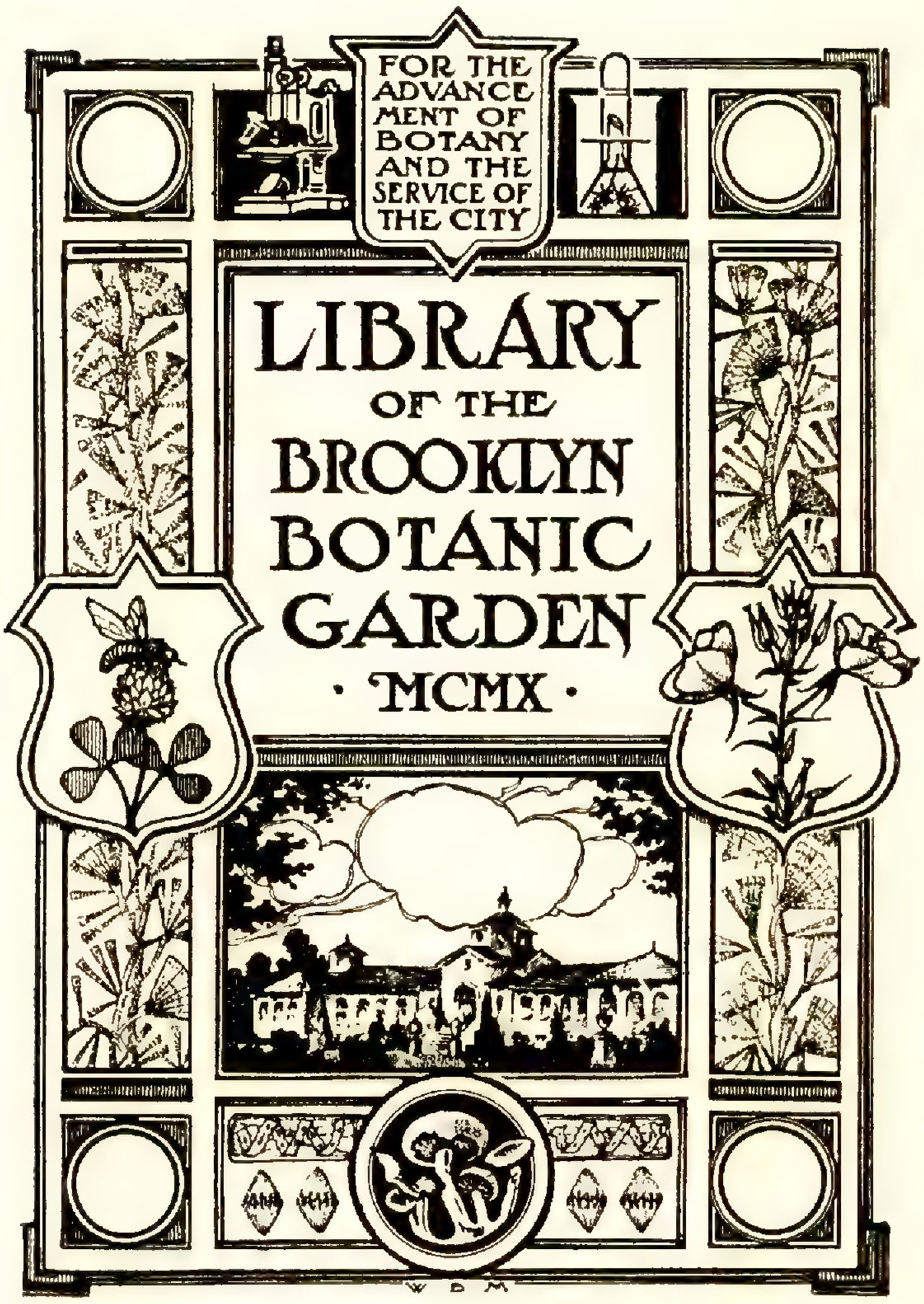

FIG. 12. Book-Plate of the Brooklyn Botanic Garden.

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES

BROOKLYN BOTANIC GARDEN

RECORD

VOL. I Brooklyn, N. Y., October, 1912 No. 4

THE NEEDS OF THE LIBRARY

In the first annual report of the Garden (B. B. G. RECORD 1:37. Ap 1912), attention was called to the fact that the library had grown, in accordance with our more urgent needs, as rapidly and extensively as the space at our disposal would permit. Mention was also made of the action of the Committee on Botanic Garden, on November 9, 1911, to the effect that all expenses for the purchase and binding of books should be met from the private funds of the Garden, so that the Library should be entirely the property of the Institute. For several and obvious reasons this was a very wise action, not only because it is entirely appropriate that the Institute should do this much, as part of its share toward maintaining the Garden, but also because the administration of the library independent of all outside supervision is thereby insured. The Garden should own its books for the same reason that it should own the living plants, herbarium specimens, and lantern slides, as is already provided.

A well chosen library is absolutely essential in order properly to classify, name, and label our collections and public exhibits. Standard classical works as well as current and recent publications are necessary, not only for the purpose just stated, but also to facilitate such investigations as members of staff and other resident investigators wish, and ought to be expected, to undertake. Furthermore, the work which the Garden plans to inaugurate in order to make itself helpful to local schools in connection with their botanical instruction, necessitates a collection of texts and other books, chosen with special reference to this phase of the Garden's work.

The decision to own the library, however, places on the administration, not only the burden of expense thereby entailed, but also the responsibility for the prompt and efficient development of our collection of books. We have now a reasonable expectation of entering the first section of our new building not later than April 1, 1913, and thereafter we shall not only be able to accommodate a considerable increase in the library, but our more extensive activities, made possible by entering the building, and our increased staff, will make the need of library facilities increasingly urgent.

On page 43 of the annual report above referred to, there was suggested the desirability of the early consideration of a plan for securing suitable private funds for library purposes. The annual income of $2250 from the endowment fund of the Garden is quite inadequate for the purpose of initial installation, especially in view of the heavy drafts made upon this sum during the early years of the Garden for living plants, lantern-slides, and other purposes properly chargeable to this account. As stated in the annual report, from $5000 to $10,000 could not only be profitably expended at once for books and periodicals, but the availability of such a sum becomes quite imperative, if the work of the Garden is not to be greatly retarded.

In addition to the above sum to be immediately expended, the library should have an endowment sufficiently large to yield an annual income of from $1000 to $1200, to be expended for the purchase of books, subscriptions to periodicals, binding, the card catalog, and other purposes.

In addition to money, gifts of botanical books and pamphlets, and back numbers of botanical periodicals will all be welcome. If duplicates are received they can be advantageously used in exchange with other libraries, or with individuals and dealers.

The following table gives a list of ten of the more important botanical periodicals, not now possessed by the Garden, together with a plan whereby, for a stated sum, the back numbers could be secured and the cost of the subsequent annual subscriptions and binding be met.

Thus, for example, we have quotations for a complete set

of the *Annals of Botany*, vols. 1-20, 1887-1909, at $237.50. The cost of annual subscription ($7.50) plus approximate cost of binding ($1.00-$2.00), a total of $8.50 or $9.50, could be met by a gift of $250, placed at interest at four per cent. The total amount of the gift that would endow this publication in perpetuity is approximately $487.50.

A library gift made for such a definite purpose would have unity, would occur in one place on the shelves, and the donor (unless wishing to the contrary) could very properly be designated by a special book-plate. In case of suspension of publication of any periodical, the sum could be applied otherwise, either as the donor might designate, or as the needs of the library would best be served in the judgment of the librarian and the Director of the Garden. There would always be plenty of opportunities to utilize the gift to advantage.

As shown by the table (p. 94), the total sum required to endow all of the publications named would be only $5,170.00.

It is not intended to imply that the immediate and urgent needs of the library are covered by these ten periodicals. The table is given merely to indicate, in a concrete manner, how such a sum as is named, could immediately be put to good use.

C. Stuart Gager.

LIBRARY OF THE BROOKLYN BOTANIC GARDEN

BOTANICAL SERIALS NEEDED

JAHRBÜCHER FÜR WISSENSCHAFTLICHE BOTANIK:			
Complete Set to date	$593.75	(M2375)	
Subscription $15 yr. + binding $2=$17	425.00	at 4%=$17	
	$1,018.75		$1,018.75
BOTANISCHER JAHRESBERICHT:			
Complete Set to date	$300.00	(M1200)	
Subscription $20—$40 yr. + binding $1=	1,000.00	at 4%=$40	
	$1,300.00		1,300.00
ANNALS OF BOTANY:			
Vols. 1–20, 1887–1909	$237.50	(M950)	
Subscription $7.50 + binding $2=$9.50	250.00	at 4%=$10	
	$487.50		487.50
BERICHTE DER DEUTSCHEN BOTANISCHEN GESELLSCHAFT:			
Bd. (vols.) 1–29, 1883–1911	$106.25	(M425)	
Subscription $7 + binding $1=$8	200.00	at 4%=$8	
	$306.25		306.25
BOTANISCHES CENTRALBLATT:			
Bd. (Vols.) 1–60, 1880–1907	$87.50	(M350)	
Bd. (Vols.) 1908–1912 at $7	35.00		
Subscription $7 + binding $1=$8	200.00	at 4%=$8	
	$322.50		322.50
BOTANISCHES CENTRALBLATT—BEIHEFTE:			
Bd. 1–21, 1891–1907	$65.00	(M260)	
Subscription $8 + binding $1=$9	225.00	at 4%=$9	
	$290.00		290.00
BIOLOGISCHES CENTRALBLATT:			
Bd. 1–29, 1881–1909	$93.75	(M375)	
1910–1912 inc. at $5 per Vol	15.00		
Subscription $5 + binding $1=$6	150.00	at 4%=$6	
	$258.75		258.75
REVUE GÉNÉRALE DE BOTANIQUE:			
Vols. 1–23, 1889–1907	$73.75	(M295)	
1908–1912 inc. at $4	20.00		
Subscription $4 + binding $1=$5	125.00	at 4%=$5	
	$218.75		218.75
BOTANICAL GAZETTE:			
Vols. 1–50, 1875–1910	$225.00		
Subscription $7 + binding $1=$8	200.00	at 4%=$8	
	$425.00		425.00
LA CELLULE:			
Vols. 1–25, 1885–1909	$237.50	(M950)	
1910–1912 inc. at $10	30.00		
Subscription $10 + binding $1=$11	275.00	at 4%=$11	
	$542.50		542.50
Total			$5 170.00

THE GARDEN BOOK-PLATE

The accompanying illustration (fig. 12) is a *facsimile* of the new book plate for the library. The composition of the design is by Mr. William B. Miller, a Brooklyn artist, the elements being supplied by the Garden. Most of the elements will be readily interpreted by all students of botany. In the lower portion of the central panel is an illustration, from the architect's drawing, of the laboratory building now in process of erection. The view shown is the western (main) entrance, facing the Garden.

The shield at the center of the upper border bears the motto of the Garden, "For the advancement of botany and the service of the City." This motto embodies the purposes of the Garden as stated more fully in the *Agreement* between the City of New York and the Brooklyn Institute (B. B. G. RECORD 1:8, 13. 1912). At the left of the shield, a compound microscope typifies the microscopical phase of botanical science, while at the right is shown the classic experiment to demonstrate the evolution of oxygen in photosynthesis, typifying plant physiology.

The design of the bee and clover on the left border recalls the fundamental observations of Joseph Gottlieb Koelreuter (1733-1806) and of Christian Konrad Sprengel (1750-1816), and is intended to typify plant ecology. It will be recalled that Koelreuter, who was the first botanist to investigate scientifically (i. e., by systematic and accurate observations and experiments) the question of plant hybrids, was also the first botanist clearly to perceive the relation between flowers and insects, to study the structure of the flower with reference to pollination, and to discover the use of nectar. Sprengel is, of course, known as the author of the famous book, *"Das entdekte Geheimniss der Natur im Bau und in der Befruchtung der Blumen.* ("The discovered secret of nature in the structure and fertilization of flowers"), in which Koelreuter's observations were greatly extended, and attention called to the very common occurrence of cross-pollination in nature.

The design at the middle right border will at once be recognized as the terminal portion of the shoot of an evening-primrose. This design is, in fact, a reduced *facsimile* of the illustration

of *Oenothera Lamarckiana,* occurring as the frontispiece of volume one of de Vries's *Die Mutationstheorie.* As is now well known, this is the first plant which was observed by de Vries to throw mutants in its seed progeny, an epoch-making observation, not only for botany, but for all biological science and evolutionary philosophy, as it was the first time in the history of science that the origin of a new species was actually observed. This design typifies, on the side of pure science, experimental evolution, and, on the side of applied science, may also be taken to stand for plant breeding.

The fleshy fungi at the center of the lower border typify mycology. The mitotic spindles on either side of the fungi typify cytology, while the portion of a *Spirogyra* (pond scum) filament just above will doubtless recall, to everyone who has studied botany, the early laboratory periods of his beginning course. So nearly universal is the use of spirogyra in elementary laboratory work that it, probably more fully than any other plant, suitably typifies elementary instruction. The diatom colonies on the left and right borders will be recognized at once as taken from Smith's familiar illustration of *Licmophora flabellata,* occurring in volume one of Goebel's *Organographie,* and elsewhere. This plant was chosen for purely decorative purposes, though its botanical significance is of course obvious.

The writer feels that the artist is to be congratulated for so successfully utilizing, in an artistic way, objects that were not primarily intended for use in artistic design. The bookplate typifies most of the departments of botany which are the chief interest of the Brooklyn Botanic Garden.

C. S. G.

THE FIRST BOTANIC GARDEN ON LONG ISLAND

The Garden library has recently secured a copy of the "Catalogue of fruit and ornamental trees and plants, bulbous flower roots, green-house plants, &c., &c., cultivated at the Linnaean Botanic Garden, William Prince, *proprietor,* Flushing, Long-Island, near New York." The copy is of the twenty-second edition, printed by T. and J. Swords, New York, 1823.

FIG. 13. The Prince Homestead, Flushing, L. I. The Box Trees Are Over 100 Years Old.

So far as available records show, the Linnaean Garden was the first botanic garden to be established on Long Island, the first in New York State, and the second in North America. The first garden in the State was the Elgin Botanic Garden, established in New York City by Dr. David Hosack, in 1801, while the first garden in the United States, and still preserved, was undoubtedly that of Dr. Bartram in Philadelphia, 1728.

The Linnaean Garden, at Flushing, established in 1737, had

an area of about 20 acres, with "green and hothouses" 100 feet long by 30 feet wide. The preface to the *Catalogue* states that exchanges had been effected with other gardens "in different parts of the globe," including direct importations from China. Gifts of seeds and plants are acknowledged from Thouin, of the Jardin des Plantes, Paris; Nuttall; Hunnewell, of Boston; and Dr. David Hosack, and Dr. John Torrey of New York City.

The development of such a garden was much more difficult in those days of less rapid transportation than now, and the author states that frequently as many as twenty attempts had to be made to import a given species before the efforts met with success. In addition to ornamental and fruit trees, and edible and decorative flowering plants, the garden contained over 4,000 species of medicinal plants, including all of those figured and described by Bigelow and Barton.

Seeds were received of all the species collected by Nuttall during his western tour of botanical exploration, and seeds of eighty-four species from the Yellowstone, collected by Dr. James, of Albany, N. Y. The preface also contains a regret that the Federal government had so far (1823) failed to establish a "botanic institution" in Washington.

Of course, the Prince garden was fundamentally a nursery, and the name Linnaean Botanic Garden was not given until about 1793. When the British took possession of Long Island, during the Revolutionary War, Gen. Howe placed a guard to protect the nursery from harm. The war injured the nursery business, however, and Waller's "History of the town of Flushing" states (p. 137), that Mr. Prince was obliged to sell a large number of grafted cherry trees for hoop poles, used in making barrel hoops.

Mr. William Robert Prince was a close friend of Torrey and Nuttall, and botanized with them both throughout the entire line of Atlantic states. So well was he known that at one time a letter addressed to William Robert Prince, America, was delivered to him at Flushing with very little delay.

The proprietors of the garden were always endeavoring to secure the latest novelties. They are stated to have been the first to introduce *Mahonia* into American gardens, and

also offered double flowered pears, cherries, and apples. In front of the old Prince homestead, at Flushing, L. I., are two box trees that have stood in their present location for one hundred years (fig. 13). There is still standing there also a tall cedar-of-Lebanon, which, so far as known, is the oldest specimen of this tree in America. Magnificant specimens of the bald cypress (*Taxodium distichum*) from this garden are still standing in the streets of Flushing. The daughter of Mr. William Robert Prince, who still resides in Flushing, is authority for the statement that, at the time of the potato famine in Ireland, her father paid six hundred dollars for less than a pint of bulbs of the yam (*Dioscorea Batatas*), with the idea of ascertaining whether its thick farinaceous root might not be introduced into America as a substitute for potatoes. The Garden has been presented with a copy of a well executed wood cut which Mr. Prince had prepared, illustrating the botanical features of this plant.

While the Linnaean garden was not primarily a scientific institution, the interest of its several proprietors, grandfather, father, and son, in plants for their own sake—in pure science—had much to do with the success of the garden, and especially with the profound and lasting influence which it exerted on American horticulture.

C. Stuart Gager.

FIG. 14. View in the Economic Garden (Section VI.) taken August 3, 1911. The blanket label shown is a temporary one.

THE ECONOMIC GARDEN

The radical changes in grade in the Garden, necessitated in realizing the plan of the landscape architects, has made it necessary to postpone the installation of most of the herbaceous sections, including the systematic, until 1913, and to make only temporary installation of the morphologic and economic sections. It was decided to start the economic section early, not only because the plants in this section could be cared for with comparative ease without greenhouse facilities, but also because of the popular nature of this kind of an exhibit in a large city like Greater New York.

It would indeed seem absurd in a village or small city to offer the public as an educational exhibit, specimens of corn, tomatoes, pumpkins, and cabbages, but in a city the size of Greater New York there are innumerable children and young people who have never seen the plants that produce the common garden vegetables—who have never seen strawberries, for example, except in a box at the grocers, or beans and peas growing on the plants that produce them. Under such circumstances, an economic garden, containing not only some of the more unusual economic plants, but also the commonest garden vegetables, is of real educational value, and as our experience of two seasons demonstrates, of considerable popular interest.

Our economic garden has been temporarily placed in the northwest portion of the grounds, just south of the local flora section. Twenty beds have been planted in four rows. Those in the first two rows contain food and fodder plants and condiments, those in the third row, medicinal plants, and those in the fourth row, fiber plants. Figure 14 shows this section as it appeared in the summer of 1911. The appearance was substantially the same in 1912. The blanket label shown in the illustration is a temporary one.

Among the plants exhibited and seldom seen growing in this region, especially by inhabitants of the city, may be mentioned hemp, flax, cotton, peanut, rye and wheat. It is the intention ultimately to grow, by the side of each cultivated plant, the wild plant from which it was derived, whenever this is known, or else the nearest related wild plant. Labels will indicate the

plant parts used economically, and also interesting botanical facts concerning the plants. The section, when completely installed, will include three Divisions, viz., A. Foods and condiments, B. Medicinal and poisonous plants, C. Fiber plants.

C. S. G.

APPOINTMENT OF DR. OLIVE

As indicated on page 32 of the current volume of the RECORD, the departmental organization of the Garden includes a department of public instruction, for the primary purpose of making the Garden as useful as possible to local schools in connection with their instruction in botany. It was a pleasure to announce, in the preceding (July) number of the RECORD, the appointment of Dr. Edgar W. Olive as Curator of Public Instruction, in charge of this department, and also of the work in Plant Pathology in the department of Graduate Study and Research.

Dr. Olive is an alumnus of Wabash College (B. S., '93; M.S., '95), and pursued graduate work in Harvard University, receiving the degree of A.M. in 1897, and Ph.D. in 1902. From 1893 to 1895 he was instructor in botany at Wabash, was teacher of science in the high school at Frankfort, Ind., during 1895-96, and from 1897 to 1903 he was instructor in Harvard and Radcliffe. During 1903-06 Dr. Olive served as research assistant in the Carnegie Institution of Washington, spending one year in botanical research at Bonn, Germany. On returning to this country he was also made a resident lecturer in botany at the University of Wisconsin (1904-07), and in 1907 was appointed professor of botany in the State College of South Dakota, and state botanist.

Dr. Olive is a fellow of the American Association for the Advancement of Science, a member of the Botanical Society of America, and of several other scientific organizations, and well known in the botanical world for his admirable studies in the cytology and life history of the rusts and other fungi.

RECENT ADDITIONS TO THE LOCAL FLORA GARDEN

The completion of the path along the Flatbush Avenue border mound has made possible the cultivation of a large number of woodland and northern plants not easily grown in open situations. The summer sun at the Garden is intense, and most of the shade-inhabiting species will not grow without some protection from it. As described in the April number of the RECORD, a place has been prepared for such plants and the Garden has been fortunate in getting a promising nucleus of a shade collection.

This has been made possible largely through the efforts of Mrs. C. S. Phelps of Salisbury, Conn., a discriminating botanist and an excellent collector of living plants. The region about Salisbury is a peculiarly rich one botanically. Situated in the northwestern corner of Connecticut, it is the southern outpost of many northern plants which come down through the Berkshires, and frequently find their southern limit of distribution in northern Litchfield county.

It would be impossible to note all the plants which have been collected by Mrs. Phelps, but a few are here worthy of note, either because of their rarity or on account of their limited distribution within the local flora range.*

Among the rarest and most interesting acquisition is the small Bishop's cap (*Mitella nuda*). This is much smaller than the common *Mitella diphylla,* and has been collected within the range prescribed above only at Salisbury, Conn., and in the mountains of Pennsylvania. It grows in moist, cool woods, and our border path is the only place in which we can hope to make this rare little saxifrage grow. In similar situations, and nearly as rare, is the creeping Snowberry (*Chiogenes hispidula*). This prostrate little creeper, with tiny white flowers and snow-white

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*The local flora range, from any part of which plants may be collected for the wild flower section of the Garden, is as follows: All of the State of Connecticut; in New York the counties bordering the Hudson River up to and including Columbia and Greene, also Sullivan and Delaware counties, and all of Long Island; all of New Jersey; and in Pennsylvania, Pike, Wayne, Monroe, Lackawanna, Luzerne, Northampton, Lehigh, Carbon, Berks, Schuylkill, Montgomery, Philadelphia, Delaware, and Chester counties.

berries, reaches its most southerly station near Salisbury, so far as the local flora is concerned. It has previously been collected only in the Catskills and far to the northward.

Growing on the top of Bear Mountain, near Salisbury, at an elevation of 2,500 feet, the writer collected some herbarium specimens of the three-toothed cinquefoil (*Sibbaldiopsis tridentata*) on July 4, 1911. Mrs. Phelps, from near the same locality, has now sent us living plants of this rare species and at the present writing, they look as though they would grow. The plant is found wild from the mountains of Greenland to the southern Alleghanies. So far as our range is concerned, it is otherwise known only from the highest peaks of the Catskills and from the mountains of Pennsylvania.

The purple Marshlocks (*Comarum palustre*), which inhabits cold bogs, but grows usually in the open sunlight, is also among the Phelps collection. It has been collected heretofore only at Budd's Lake, N. J., and is extremely rare even in Greenland and Alaska, which are its northern limits of distribution. It is now apparently well established among the cranberries and chamaedaphnes in the artificial bog.

A trio of specially desirable plants in this collection are the Shin-leaf (*Pyrola elliptica*), *Pyrola secunda,* and *Pyrola rotundifolia.* These belong to a large class of plants the cultivation of which is difficult. This plant is one of a large number of species which require a certain fungus in symbiotic association with their roots. There is probably some reciprocal benefit in this alliance between the plant and the fungus, and it is doubtful if such plants as these Pyrolas can be grown successfully without a definite inoculation of the soil with the fungal organism. This frequently happens in transplanting, and as all our specimens seem to be flourishing, it is probable that the reciprocal activities of the plant and fungus have been maintained along the border mound. All the soil conditions have been made as near like the humus-covered forest floor of our woods as can be.

Many other rare and interesting plants have come in from the same collector, but most of them are now growing in ordinary garden soil in Section II, and do not require the highly specialized conditions described above.

NORMAN TAYLOR.

DOCTORATES CONFERRED IN BOTANY BY AMERICAN UNIVERSITIES IN 1912

For the past fifteen years it has been the custom of *Science* to publish annually records of the doctorates of philosophy conferred by American Universities. The total number of doctorates conferred in all subjects during the first five of these years was 233. During the last ten years the number more than doubled, being 492. According to the last statement (*Science N. S.* **36**: 129-139. 2 Ag 1912), the number of degrees conferred in the natural and exact sciences increases more rapidly than in other subjects. In this group chemistry has always led in the total number of degrees conferred, with physics second, and, until 1912, zoology third. During the present year, however, more degrees were conferred in botany than in zoology. Agriculture and bacteriology are not considered as "botany," in making up this total.

Out of a total of 30 degrees conferred in botany in 1912, the University of Chicago conferred 7, Columbia 3, Cornell 6, and California, Johns Hopkins, Michigan, Indiana, and Iowa, 2 each.

The subjects of the doctorate theses in botany for 1912 were as follows:

University of Chicago

Melvin Amos Brannon: "The Action of Salton Sea Water on Plant Tissues."

Sophia Hennion Eckerson: "A Physiological and Chemical Study of After-ripening."

Laura Campbell Gano: "The Physiographic Ecology of Northern Florida."

Stella Mary Hague: "A Morphological Study of *Diospyros virginiana*."

Ansel Francis Hemenway: "The Phloem of Dicotyledons."

Lester Whyland Sharp: "Spermatogenesis in Equisetum."

Anna Morse Starr: "Comparative Anatomy of Dune Plants."

Columbia University

Bernard Ogilvie Dodge: "Methods of Culture and the Morphology of the Archicarp in certain Species of the Ascobolaceae."

Raleigh Frederick Hare: "A study of the Chemistry of the Carbohydrates of the Prickly Pear and its Fruits."

Winifred Josephine Robinson: "A Taxonomic Study of the Pteridophyta of the Hawaiian Islands."

Cornell University

Mortier Franklin Barrus: "The Bean Anthracnose."

Christian Nephi Jensen: "Fungous Flora of the Soil."

Clyde Everett Leighty: "Studies of Variation and Correlation of Oats (*Avena sativa*)."

Merris Mickey McCool: "The Antitoxic Action of certain Nutrient and Non-nutrient Mineral Bases with respect to Plants."

John Edwin Turlington: "The Effect on Plant Growth of Nutrients applied at different Periods."

Rhett Youmans Winters: "The Inheritance of Size of Capsules in Pepper Hybrids."

Johns Hopkins University

Oliver Baker Hopkins: "The Carboniferous Sphenophyllales, Equisetales and Lycopodiales of Maryland, including certain Forms from Pennsylvania and Ohio."

Willis Edgar Maneval: "The Development of *Magnolia* and *Liriodendron,* including a Discussion of the Primitiveness of the Magnoliaceae."

Yale University

Marion Graham Elkins: "The Maturation Phases in *Smilax herbacea.*"

University of Illinois

Albert Lemuel Whiting: "A Biochemical Study of Nitrogen in certain Legumes."

University of California

Thomas Harper Goodspeed: "Quantitative Studies of Inheritance in *Nicotiana* Hybrids."

Walter Pearson Kelley: "The Functions and Distribution of Manganese in Plants and Soils."

University of Michigan

Henry Newell Goddard: "Can Soil Fungi Assimilate Atmospheric Nitrogen?"

Elizabeth Dorothy Wuist: "The Morpho-physiological Life History of the Gametophyte of *Onoclea struthiopteris.*"

OHIO STATE UNIVERSITY

Freda Detmers: "An Ecological Study of Buckeye Lake—a Contribution to the Phytogeography of Ohio."

INDIANA UNIVERSITY

Caroline Anna Black: "The Morphology of *Riccia frostii* Aust."

William Logan Woodburn: "Spermatogenesis in certain Hepaticae."

UNIVERSITY OF IOWA

James Ellis Gow: "Embryology of the Aroids."
Fred Jay Seaver: "The Hypocreales of North America."

STANFORD UNIVERSITY

Hally Delilia Mary Jolivette: "Studies on the Reaction of Pilobolus to Light Stimuli."

SUMMER COURSES IN BOTANY IN NEW YORK CITY AND VICINITY, 1912

During the past summer, courses in botany were offered in New York City at Columbia University and New York University, and in the Biological Laboratory at Cold Spring Harbor, L. I., by the Brooklyn Institute of Arts and Sciences. In all, seven different courses were offered, and the total registration was fifty-eight, as follows:

INSTITUTION	TITLE OF COURSE	NO. OF STUDENTS	LECT., LAB., OR BOTH
Brooklyn Institute	Cryptogamic Botany	12	Both
" "	Research	3	Lab.
Columbia University	General Botany	15	Both
" "	Plant Physiology	16	Both
New York University	General Botany	8	Both
" " "	Advanced Botany	1	Lab.
" " "	General Bacteriology	3	Both

At Cold Spring Harbor the courses were given by Prof. Harlan H. York, of Brown University; at Columbia, by Prof. C. C. Curtis and Dr. B. O. Dodge, of Columbia; and at New York University, by Prof. George M. Reed, of the University of Missouri.

NOTES

In connection with the statement on pages 91-94 of the present number of the RECORD, setting forth certain needs of the library, it is a pleasure to acknowledge here a gift from Mr. Alfred T. White of one thousand dollars for library purposes.

On Aug. 17 a class of boys with their teacher from the Chelsea Park School-Garden, 9th Ave. and 27th St., Manhattan, visited the Garden primarily for the purpose of seeing the Economic Section. The appropriateness of an exhibit of common garden vegetables in a city of the size of New York was well illustrated by a remark of one of these boys, who, seeing the rather small, yellow pumpkins on the vines, exclaimed, "O, see the oranges!" It is difficult for one who has ever lived in a small city or village to realize that thousands of children in New York City have never seen the common garden vegetables and forage plants growing. The boys were also much interested in the piles of compost and leaf mould in the service yard, as all the weeds pulled from their own school garden are preserved in a pile to make compost.

The first number of the projected series of GUIDES, entitled, "The Brooklyn Botanic Garden," was issued last June, as a reprint from the *Popular Science Monthly* for April, 1912. This number is intended to serve as introductory to the series, and as a guide to the general plan of the grounds as laid out by the landscape architects, to the plans of the buildings, and briefly to the aims and purposes of the institution. The price of this number is five cents. The front page of the cover was designed by Mr. Frederick W. Goudy, of New York City.

Mr. Cullen Adlerblum, a graduate of the College of the City of New York, class of June, 1912, has been acting as Student Assistant in the Garden during the past summer, making a study of the local flora, and preparing specimens for the herbarium of plants cultivated in the Garden.

On July 8-13 the Director of the Garden and the Curator of Plants made a trip to Ottawa and Montreal, Canada, to visit the botanic garden at the Central Experimental Farm of the Dominion Government, in Ottawa, and the biological labora-

tories at McGill University in Montreal, and to arrange for securing specimens of shrubs for the Garden.

Among recent accessions to the Garden library a complete set of the *Verhandlungen des naturforschenden Vereines in Brünn,* twelve volumes, from 1862 to 1873 inclusive, may be mentioned as of special value and interest, since volume four of this publication contains the original paper of Gregor Mendel on plant hybrids (*Versuche über Planzen-Hybriden*). As is now well known, this paper, presented before the Society of Naturalists of Brünn, contains the first announcement of Mendel's fundamental and now classic experiments. This paper was presented before the Society in two parts, the first at the meeting of February 8, 1865, the second at the following meeting, on March 8. It is printed in full in the *Abhandlungen* of volume 4, pages 3-47.

On July 20 the Garden was visited by Dr. George M. Reed, professor of botany in the University of Missouri. Dr. Reed gave the botanical courses in New York University during the summer session just closed.

Mr. Norman Taylor spent the week of June 3 at the Arnold Arboretum, Jamaica Plain, Mass., making a study of the collections there, and arranging for securing cuttings of shrubs for the Garden. On his return trip a visit was made to the botanic garden of Smith College.

On June 30, Mr. Borin, head gardener, and Mr. Lemborg, gardener, went to the Arnold Arboretum to secure cuttings of shrubs, Mr. Borin returning with part of the cuttings on July 2, and Mr. Lemborg with the remainder on the day following.

On July 11, 1912, the Board of Estimate of New York City adopted the Amendment to the Agreement between the City and the Institute (see B. B. G. RECORD, 1:7-16. 1912), whereby the Garden is to receive additional land of about three acres, formerly a part of the Prospect Hill reservoir lands, and further providing that the income of the Garden endowment of $50,000 is no longer restricted in use to the purchase of plants, but may also be used for the benefit of the Garden in other ways. The amendment, approved by the Corporation Counsel, was signed by the Mayor on Sept. 9.

Prof. R. A. Harper, of Columbia University, and Prof. J. B. Overton, of the University of Wisconsin, visited the Garden on July 21, and Prof. Duncan S. Johnson, Professor of Botany and Director of the Botanic Garden at Johns Hopkins University, on September 17.

On the afternoon of September 12, Prof. Hugo de Vries, of the University of Amsterdam, Holland, planted a tree in the Garden, and in the evening delivered a lecture at the Academy of Music, under the joint auspices of the Garden and the Department of Botany of the Institute, on "Plant Breeding in the University of Amsterdam." Preceding the lecture an informal dinner was given to Prof. de Vries at the home of the Director of the Garden.

The following persons were among those who attended the tree planting exercises: Dr. F. A. Lucas, Director of the American Museum of Natural History, New York City; Dr. C. B. Davenport, Director of the Station for Experimental Evolution of the Carnegie Institution of Washington, Cold Spring Harbor, L. I.; Prof. Franklin W. Hooper, Director of the Brooklyn Institute of Arts and Sciences; Col. Robert B. Woodward, Vice President of the Brooklyn Institute; the Hon William B. Coombs, of the Executive Committee of the Institute trustees; Dr. G. H. Shull, Station for Experimental Evolution; Dr. Fred J. Seaver, Curator, New York Botanical Garden.

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